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DESCRIPTIVE CATALOGUE

OF THE

FOSSIL ORGANIC REMAINS

OF

REPTILIA AND PISCES

CONTAINED IN

THE MUSEUM

OF

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

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THE First Volume of the Catalogue of the Fossil Organic Remains in the Museum of the College contains the descriptions of those belonging to the classes *Mammalia* and *Aves*: the present Volume, which completes the account of the Fossil Remains of the Vertebrated Animals, is devoted to the *Reptilia* and *Pisces*.

The proportion of original Hunterian specimens to those subsequently added to the Museum, is greater in the Reptiles and Fishes, than in the Warm-blooded classes previously described; but the same system of incorporated arrangement and consecutive numbering has been followed as in the preceding Volume. The original specimens, 351 in number, are specified as *Hunterian*; and the Collegiate specimens are indicated by the name of the *Donor*; or, when obtained by purchase at the sale of a Museum, by the name of its *Founder*.

In his attempt to elucidate the nature of these remains, Hunter had placed in the same tray with many fossils of extinct species the corresponding part of the nearest allied existing animal.

The names now given to the specimens, and the determination of their place in the Zoological series, will guide the student to the recent skeletons and teeth of existing species described in the Osteological Catalogue, which, in like manner, will elucidate the nature and affinities of those fossil Reptiles and Fishes with which the recent analogue has not been so juxtaposed.

The Hunterian Fossils described in the present Volume, show more clearly the extent of his researches in this department of Natural History than the portion described in the preceding Volume.

The fossil Reptiles and Fishes have been derived from a greater variety of strata and of countries than the remains of the Mammals and Birds. Hunter not only procured from the principal British localities characteristic examples of their cold-blooded vertebrate remains, but he had apparently spared neither pains nor expense in obtaining similar specimens from Maestricht, Solenhofen, Thuringia, Monte Bolca, Œningen, Glaris, Malta, and other continental localities celebrated for the richness of their fossiliferous strata.

Hunter's MS. Catalogue contains, in regard to a great proportion of the specimens described in the present Volume, a note of the locality whence they had been derived. This information, with the petrified state and other physical characters of the fossil, usually suffices to determine without doubt the geological formation in which it was imbedded.

When a portion of the matrix has been preserved with the fossil, its mineral nature is noted; and this fact reciprocally indicates the locality whence it has been obtained, in some instances where that information is not afforded by the MS. Catalogue. In both cases the geological age of the fossil specimen is thus ascertained.

The present part of the Hunterian Collection plainly shows that Hunter duly appreciated the study of Fossil Remains, both as extending the knowledge of the modifications of Animal structure, and as throwing light on the past history and changes of the earth.

In the "Observations on the Fossil Bones presented to the Royal Society by the Margrave of Anspach*,"—the only publication by Hunter on the subject, and the last of his contributions to the Transactions of the Royal Society,—we find that he compared the fossils with their recent analogues, and showed that they differed both from them and from each other. He next alludes to the different situations and climates, to which particular kinds of animals are more or less confined; and, by comparing the known geographical distribution of animals with the actual localities of fossil remains, he endeavours to elucidate the changes of temperature to which different parts of the earth have been subject at different epochs. He points out more distinctly, and with more detail, the evidence which fossils afford respecting the alternations of exposure and submersion, or the changes of land and sea, of which the earth's surface has been the theatre; and by his frequent allusion to the "many thousand years" which must have elapsed during these changes, he seems to have fully appreciated the necessity of that long and indefinite extent of past ages, which modern geological science has shown to be indispensable, in order to account for the changes in question.

Thus, he remarks, "From a succession of such shiftings of the situation of the sea, we may have a stratum of marine extraneous fossils, one of earth, mixed probably with vegetables and bones of land animals, a stratum of terrestrial extraneous fossils, then one of marine productions ; but from the sea carrying its inhabitants along with it, wherever there are those of land animals there will also be a mixture of marine ones ; and from the sea commonly remaining thousands of years in nearly the same situation, we have marine fossils unmixed with any others."

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* Philosophical Transactions, vol. lxxxiv. 1794.

Lastly, he treats of the nature and causes of the different states in which the remains of extinct animals are found.

"I believe," he writes, "it is generally understood that in extraneous fossils the animal part is destroyed, but I find that this is not the case in any I have met with. Shells and bones of fish must probably have the least in quantity, having been longest in the fossil state, otherwise they should have the most ; for, the harder and more compact the earth, the better is the animal part preserved, which is an argument in proof of their having been the longest in a fossil state. From experiment and observation the animal part is not allowed to putrefy ; it appears only to be dissolved into a kind of mucus, and can be discovered by dissolving the earth in an acid."—"In the fossil shark's tooth or glosso-petra*, the enamel is composed of animal substance and calcareous earth, and is nearly in the same quantity as in the recent, but the central part of the tooth has its animal substance in the state of mucus interspersed in the calcareous matter."

"All operations respecting the growth or decomposition of animal and vegetable substances go on more readily on the surface of the earth than in it ; the air is most probably the great agent in decomposition and combination, and also a certain degree of heat. Thus the deeper we go into the earth we find the fewer changes going on." —"Something similar to this takes place with respect to extraneous fossils*; for, although a piece of wood or bone is dead when so situated as to be fossilized, yet they are sound and free from decomposition, and the depth, joined with the matter in which they are often found, as stone, clay, &c., preserves them from putrefaction, and their dissolution requires thousands of years to complete it."

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* See Nos. 431-441, 451, 454, in the present Catalogue.

It is evident that the scope and generalization of the remarkable posthumous publication from which the above passages are taken, must have been based upon a more numerous and varied series of specimens than the immediate subjects of the memoir. Thus the extent, the classification, and the MS. Catalogue of the Hunterian Fossils, afford unequivocal evidence of the nature and amount of research which enabled the Founder of the Collection to elucidate the subjects submitted to him by the Royal Society, with so many important propositions relating to the general nature and relations of Fossil Organic Remains.

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* In Hunter's time, what are now called "minerals," as stone, clay, &c., were termed "natural fossils," and the organic remains imbedded in mineral strata were termed "extraneous fossils."

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CATALOGUE.

FOSSIL ORGANIC REMAINS.

Class REPTILIA.

Order CROCODILIA.

(Crocodiles, Alligators, Gavials: body supported by four partially-webbed feet, and defended by an armour of bony dermal scutes: two transverse processes on each side of the cervical and anterior dorsal vertebræ.)

a. With procœlian vertebræ; or those that have the anterior articular surface of the body concave, the posterior one convex.

Genus *Crocodilus.*

1. A coloured plaster cast of a large portion of the skull of the extinct Sheppey Crocodile (*Crocodilus toliapicus*; *Crocodile de Sheppey*, Cuvier; *Crocodilus Spenceri*, Buckland).

The end of the snout, including the premaxillaries and the external nostril, is broken off: the tympanic pedicles, pterygoid alæ and occipital tubercle are also wanting. The most characteristic differences which the *Crocodilus toliapicus* presents, as compared with existing species of Crocodile, e. g. the *Crocodilus acutus* and the *Croc. Schlegelii*, which most nearly resemble the fossil in the general form of the skull, are:—the larger size of the temporal apertures as compared with the orbits ; the more regular and rapid diminution of the head towards the snout, the straight line of the alveolar tract, and the greater relative length and slenderness of the muzzle, which is evident notwithstanding its imperfect condition. As compared with the *Crocodilus Schlegelii*, the posterior surface of the occiput is less concave : its upper boundary line is indented in the middle by the termination of a median longitudinal depression upon the upper surface of the skull, which is not present in the existing species, in which the corresponding surface is flat. The descending process of the basioccipital is smoother in the *Crocodilus toliapicus*; the interorbital space is flatter, and the profile of the facial part of the skull is straighter.

The original was discovered in the eocene tertiary deposits of the Isle of Sheppey, Kent.

Presented by the Very Rev. Dr. Buckland, F.R.S.

2. A mutilated cervical vertebra of the *Crocodilus toliapicus*. It is described in the Original Hunterian MS. Catalogue as, No. *m* 15, " A single vertebra of an amphibious animal of a middling size," and follows—No. *m* 14, " The body of a Turtle from Sheppey Island," which indicates the Founder's idea of its affinities.

   It is probably from the eocene deposits of the same locality, but that is not noted in the Catalogue. *Hunterian.*

3. A mutilated dorsal vertebra of the *Crocodilus toliapicus*. A portion of petrified clay in the neural canal indicates the specimen to have been obtained from the eocene deposits of the Isle of Sheppey, Kent. *Hunterian.*

4. The hinder end of the body of a vertebra of a Crocodile, probably *Crocodilus toliapicus*.

   From the eocene deposits, Isle of Sheppey, Kent. *Hunterian.*

5. Portions of the articular and surangular elements of the left ramus of the lower jaw of the *Crocodilus toliapicus*. This specimen shows the articular surface for the tympanic bone, which differs from that of the recent Crocodiles in being more concave and more definitely divided into two portions by a longitudinal rising.

   From the eocene deposits of the Isle of Sheppey, Kent. *Hunterian.*

6. The lower or distal end of the tympanic bone of the *Crocodilus toliapicus.*

It exceeds in size the corresponding part of the largest skulls of the recent Crocodiles in the Hunterian collection.

From the eocene deposits of the Isle of Sheppey, Kent.

Presented by J. Wickham Flower, Esq.

7. A portion of the left ramus of the lower jaw of the same *Crocodilus toliapicus.*

From the eocene deposits of the Isle of Sheppey, Kent.

Presented by J. Wickham Flower, Esq.

8. Another portion of the right ramus of the lower jaw of the same *Crocodilus toliapicus.* It includes parts of the angular, dentary and splenial elements. In the dentary piece are the sockets of the six posterior teeth.

From the eocene deposits of the Isle of Sheppey, Kent.

Presented by J. Wickham Flower, Esq.

9. The hinder half of the left ramus of the lower jaw of the *Crocodilus Hastingsiæ.*

It shows well the form of the articular concavity, the angular process, and the vacuity between the surangular and angular elements of this part of the lower jaw. The five posterior alveoli are preserved in this specimen.

From the upper eocene deposits at Hordwell, Hampshire.

Presented by J. Pytts Falconer, Esq.

10. The anterior part of the right ramus of the lower jaw of the *Crocodilus Hastingsiæ*, including sixteen sockets for teeth, of which the first, third, fourth, eleventh, twelfth and thirteenth are the largest, and form risings upon the alveolar tract.

From the upper eocene formations at Hordwell, Hampshire.

Presented by J. Pytts Falconer, Esq.

11. The right femur of the *Crocodilus Hastingsiæ.*

It is broken into three pieces and both extremities are mutilated.

From the upper eocene deposits at Hordwell, Hampshire.

Presented by J. Pytts Falconer, Esq.

12. The right tibia of the *Crocodilus Hastingsiæ.*

It is longer in proportion to its thickness than in the *Croc. biporcatus*, and it presents a better marked ridge on the back part of the shaft: this has been broken across, and displays a small medullary cavity with thick compact walls.

From the upper eocene deposits at Hordwell, Hampshire.

Presented by J. Pytts Falconer, Esq.

13. Two dermal scutes and a tooth of the *Crocodilus Hastingsiæ*.

From the upper eocene deposits at Hordwell, Hampshire.

Presented by J. Pytts Falconer, Esq.

14. A small fragment of the dentary element of the lower jaw of the *Crocodilus sivalicus,* with two teeth: the crowns of these are short.

From the tertiary deposits of the Sub-Himalayan mountain range, India.

Presented by the Rev. Mr. Everest, M.A.

15. A large dermal scute of the *Crocodilus sivalicus,* broken in two.

From the tertiary deposits of the Sub-Himalayan mountain range, India.

Presented by the Rev. Mr. Everest, M.A.

16. A dermal bony scute of the *Crocodilus sivalicus.* The external prominence is much developed.

From the tertiary deposits of the Sub-Himalayan mountain range, India.

Presented by Colonel Cautley, R.E., F.R.S.

17. The third cervical vertebra of the *Crocodilus basitruncatus.* It shows the transverse arched ridge crossing the under and fore-part of the centrum between the parapophyses: a very deep and wide depression divides the latter process from the diapophysis.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

18. The centrum of a similar vertebra, perhaps the fourth cervical, of the *Crocodilus basitruncatus.*

It shows a broad, smooth, subcircular prominence between the bases of the parapophyses. The depression between the parapophysis and diapophysis is narrower in the vertical direction than in the preceding specimen: there is a depression anterior to the diapophysis.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

19. A cervical vertebra, corresponding with the fifth in the Alligator, of the *Crocodilus basitruncatus.* The neural canal is less quadrate, more circular, and the antero-posterior diameter of the base of the neurapophysis is shorter in proportion to that diameter of the centrum, than in the existing Alligator of North

America. The parapophysis is depressed; its base is half the length of the centrum.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

20. The body and base of the neural arch of a dorsal vertebra of the *Crocodilus basitruncatus.*

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

21. A third or fourth cervical vertebra of the *Crocodilus basifissus.* It differs from the corresponding vertebra of the preceding species in the position of the parapophysis at the middle third of the non-articular surface of the side of the centrum, and in its minor antero-posterior extent. The centrum is rather more depressed: there are two small and low prominences at the fore-part of its under surface, divided by a narrow groove leading to a central vascular canal. There is a deep depression between the parapophysis and the diapophysis: the base of the diapophysis is shorter in the axis of the vertebra, but a stronger ridge is continued from its fore-part to the anterior zygapophysis, than in the *Crocodilus basitruncatus.*

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

22. The succeeding cervical vertebra of the *Crocodilus basifissus.*

It shows the same characters of the double tuberosity and central vascular pit on the under part of the centrum, the same median position of the parapophysis, with the larger proportions of that process, and the same comparatively greater breadth and minor height of the centrum, as in No. 21.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

23. A posterior cervical vertebra, probably the seventh, of the *Crocodilus basifissus.* The vertical diameter of the base of the parapophysis exceeds the antero-posterior one, but the process is distant its own breadth from the anterior margin of the centrum, and a ridge is continued from it to the neurapophysial surface.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

The above specimens (Nos. 17—23) are chiefly interesting from being the first evidences of the genus *Crocodilus* or *Alligator*, as restricted in modern systems, that have been discovered in strata older than the eocene tertiary.

Genus *Gavialis*.

24. A mass of pyritic clay, including a portion of the dentary element of the lower jaw of the *Gavialis Dixoni*. See Tab. 12. figs. 22 & 23 of Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' 4to.

From the eocene deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

b. With amphicœlian vertebræ; or those that have both articular ends of the body subconcave.

Genus *Teleosaurus*[*].

25. A coloured plaster cast of the left side of the cranium of the fossil Crocodile of Caen (*Teleosaurus Cadomensis*). See Cuvier's 'Ossemens Fossiles,' tom. v. pt. 2. pl. 7. figs. 1 & 2.

The original is from the oolitic strata at Caen in Normandy, and is preserved in the Museum of the Jardin des Plantes at Paris.

Presented by Baron Cuvier.

26. A block of Caen oolite in which are imbedded portions of vertebræ of the *Teleosaurus Cadomensis*.

This stone was employed in the erection of some buildings in Dean's Yard, Westminster, and the fossils were discovered in the working of the stone. A portion of the skeleton remains imbedded in the stone, which now forms part of the building.

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[*] This name was devised by Geoffroy St.-Hilaire, from the Greek words τέλος *end*, and σαῦρος *lizard*, and applied to the 'Gavial de Caen,' described by Cuvier, 'Ossemens Fossiles,' tom. v. pt. 2. p. 127. pl. 7. It is here restricted, as in the 'Report on British Fossil Reptiles,' 8vo. 1841, p. 72, to those amphicœlian Crocodiles with long, narrow jaws, armed with slender, conical, sharp-pointed, equal-sized teeth, adapted, like those of the existing Gavials, for the capture and destruction of fishes; but which had the external nostril terminal and subvertical, and the internal nostril or posterior aperture of the nasal canal beneath the presphenoid.

From the oolitic quarries at Caen, Normandy.

Presented by F. Buckland, Esq., M.A., F.R.C.S.

27. A plaster cast of the cranial portion of the skull of the *Teleosaurus Chapmanni*.

The original is from the lias near Whitby in Yorkshire, and is preserved in the Museum of the Philosophical Society at York.

Presented by Prof. Phillips, F.R.S., F.G.S.

28. The body and anchylosed base of the neural arch of a cervical vertebra of the Slender-necked Crocodile (*Teleosaurus asthenodeirus*).

The terminal surfaces of the centrum are subcircular and very slightly concave. The parapophysis is remarkable for its prominence and slenderness in relation to the length of the centrum: it arises near the lower surface and about half an inch from the anterior surface of the centrum, and is subdepressed. More than half an inch intervenes between this and the base of the diapophysis, which is of less antero-posterior extent. There is no trace of hypapophysis.

From the Kimmeridge clay, at Shotover, Oxfordshire.

Presented by Professor Owen, F.R.S.

29. A dorsal vertebra with the exogenous processes broken away, of the *Teleosaurus asthenodeirus*.

The terminal articular surfaces of the centrum here assume a full oval form.

From the Kimmeridge clay, at Shotover, Oxfordshire.

Presented by Prof. Owen, F.R.S.

30. Two entire dorsal vertebræ, with part of a third, fractured through the middle of the body, and displaying a small cancellated cavity filled with calcareous spar, of the *Teleosaurus asthenodeirus*.

The length of the centrum, measured along the under surface, is 2 inches 6 lines; the vertical diameter of the articular end is 2 inches; the transverse diameter is 1 inch 10 lines; the transverse diameter of the middle of the body is 1 inch. Both the inferior and lateral surfaces of the body are regularly concave, lengthwise; and smooth, except near the expanded articular extremities, where they are striated in the axis of the vertebra. The antero-posterior extent of the transverse process is 1 inch 6 lines; that of the base of the spinous process is 1 inch 9 lines. The transverse diameter of the spinal canal is 7 lines, its vertical diameter is 4½ lines.

These vertebræ are cemented together by the matrix, which closely resembles the grey Kimmeridge clay: and a portion of a species of *Pecten* is attached, which is one of the characteristic fossils of the oolitic group of secondary rocks, especially the Oxford clay. *Hunterian.*

31. A centrum, with the anchylosed bases of the neural arch, of a cervical vertebra of a small *Teleosaurus*.

The terminal articular surfaces are slightly concave. The under surface forms a longitudinal ridge, but is not produced into a hypapophysis. The parapophyses are divided by concavities from this ridge, and by similar concavities from the diapophyses. Traces of the neurapophysial suture remain.

From the lias of Barrow-on-Soar, Leicestershire.

Presented by the Earl of Enniskillen, F.R.S., F.G.S.

32. A plaster cast of the upper portion of the cranium of the *Teleosaurus latifrons*.

The original is from the oolitic formations at Wilby, Northamptonshire.

Presented by T. L. Shuckard, Esq.

33. A coloured plaster cast of the interorbital and maxillary portion of the skull of the *Teleosaurus brevirostris*.

It shows the terminal and almost vertical nostril characteristic of the genus.

The original is from the oolitic formations of Chipping Norton.

Presented by John Kingdon, Esq.

34. A coloured plaster cast of the symphysis and parts of the two rami of the lower jaw of the same *Teleosaurus brevirostris*.

From the oolitic formations at Chipping Norton.

Presented by John Kingdon, Esq.

35. The body of a dorsal vertebra of a small *Teleosaurus*.

The articular ends are rather more concave than in other *Teleosauri*.

From the submerged Wealden deposits, Isle of Wight.

Presented by Benjamin Barrow, Esq.

36. A coloured plaster cast of the skull and of the ramus of a lower jaw of the *Teleosaurus Egertoni* (*Mystriosaurus* of Bronn and Kaup, see 'Abhandlungen über die Gavial-artigen Reptilien der Lias Formation,' fol. Stuttgart, 1841).

The originals are from the 'Lias Kalkstein' of Altdorf, near Nuremberg.

Presented by Professors Bronn and Kaup.

37. A coloured plaster cast of part of the bones of the trunk, tail, and limbs, also of part of the dermal skeleton, of the *Teleosaurus Egertoni* (*Mystriosaurus* of Bronn and Kaup).

The originals are from the 'Lias Kalkstein' of Altdorf, near Nuremberg.

Presented by Professors Bronn and Kaup.

The genus *Teleosaurus*, as defined by the sub-biconcave vertebræ and terminal position of the nostril, is divided by Professors Bronn and Kaup, according to the aspect of the orbit, into :—

Teleosaurus proper, with the orbits directed laterally, including the genera called *Pelagosaurus*, *Aelodon* :—and

Mystriosaurus, with the orbits directed upwards, including the genus called *Engyommasaurus*.

With respect to this character, it may be objected that in not one specimen of fossil Crocodile with a long and slender snout, nor in the recent Gavials, are the eyes or orbits directed either directly upwards or directly outwards: none have the plane of the orbits perfectly horizontal or perfectly vertical. In all the known species they look obliquely upwards and outwards; some more upwards, some more outwards; but not with such a marked distinction, nor with concomitant modifications of other characters, nor with the differences so constant in one group in contrast with another group, as to admit of their generic separation upon such grounds.

The *Teleosaurus Cadomensis*, e. g. No. 25, has nearly circular orbits, which look rather more upwards than outwards. The *Teleosaurus Chapmanni*, No. 27, has less circular orbits directed almost half-way between the vertical and horizontal planes. The *Teleosaurus gracilis* has full elliptic orbits directed rather more laterally than upwards.

All these species agree in the sub-biconcave vertebræ, in the terminal and oblique external nostril, in the comparatively advanced position and width of the internal nostril, in the comparatively large size and close mutual approximation of the temporal fossæ, and in the diminutive proportions of the fore-limbs as compared with the hind-limbs: all which modifications may be regarded as the natural characters of the group of ancient marine long- and narrow-snouted Crocodilians, for which it has been proposed to restrict the generic name *Teleosaurus*.

The species which Prof. Kaup has described under the name *Mystriosaurus Egertoni*, and which Prof. Bronn terms the *Mystriosaurus mit länger Symphyse*, has not the plane of the orbits horizontal; they are turned towards that aspect about as much as in the *Teleosaurus Cadomensis*, but are a full ellipse in shape, as in the *Teleosaurus gracilis*.

The frontal bone of the *Teleosaurus gracilis* differs from that of the *Teleosaurus Egertoni* by terminating in a more acute angle forwards, the point of which extends further in advance of the orbits. In the *Teleosaurus Cadomensis* this point seems not to advance beyond the anterior boundary of the orbits.

As in other *Teleosauri* the frontal is flatter above than in the Gavial, and is not made concave by the raising of the superorbital border, as in the modern long-snouted genus.

Prof. Bronn describes the frontal of his *Mystriosaurus Egertoni* as having quite the position and form of that in the existing Crocodilia*, and as agreeing in all essential respects with the Gavial†; but the elevation of the orbits above the level of the vertex is a very striking and indeed essential difference between the Gavials and the Teleosaurs: it relates to different habits and modified media of existence; perhaps also to the different periods of the earth's history assigned to their existence, and therefore to different relations of co-existence. By means of the elevated orbits the Gavial can float with its head and body submerged, yet maintaining its eyes raised above the level of the stream, cognizant of the movements of any enemy floating on the river, or prowling on its banks.

The ancient Teleosauri of the secondary ocean could have had little to dread from the land; their enemies must have been the gigantic Ichthyosauri, Plesiosauri or Cetiosauri, all denizens of the deep like themselves: the Teleosauri, therefore, did not require any special uplifting of the orbits for the better or speedier detection of their marine antagonists.

With regard to the bones of the trunk and extremities, the generic resemblance in all known species is very close. The stem of the hatchet-shaped cervical ribs is longer in proportion to its breadth in the *Teleosaurus Egertoni*, than in the *Teleosaurus Cadomensis*: the humerus is also proportionally longer and stronger in the *Teleosaurus Egertoni*: it is longer, e. g. than the bodies of three posterior dorsal vertebræ, whilst in the *Teleosaurus gracilis* it equals in length only two of the bodies of the corresponding vertebræ; but these vertebræ are relatively somewhat longer than in *Teleosaurus Egertoni*.

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* Das Stirnbein—hat ganz die Lage und Form, wie bei den lebenden Krokodiliern, p. 14.

† Alles, im Wesentlichen wie beim Gavial und Teleosaurus, ib.

The humerus of the *Teleosaurus Egertoni* is more than one-fourth the length of the upper jaw, measured from the fore-part of the orbit to the end of the snout: in the *Teleosaurus gracilis* the humerus is as much less than one-fourth of the same part of the upper jaw, as in the *Teleosaurus Egertoni* it is more.

The *radius* and *ulna* exhibit the same superiority of size in the *Teleosaurus Egertoni*, as compared with the other known species, but such differences seem to be only of specific value.

38. A slab of Stonesfield slate, in which is imbedded a dermal scute of a crocodilian reptile. The superficial circular impressions are large, and the intervening surface is irregularly reticulate: it has no ridge or crest, and is probably of a *Teleosaurus*.

From the oolitic formations of Stonesfield, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

Genus *Steneosaurus*[*].

39. A coloured plaster cast of the back part of the skull, including the occipital condyle, the right temporal fossa, and the right tympanic bone with the articulation for the lower jaw, of the *Steneosaurus robustus*.

The original is from the middle oolite of Oxfordshire.

Presented by Sir Henry De la Beche, F.R.S.

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[*] This name was devised by Geoffroy St.-Hilaire, from the Greek στενὸς *narrow*, σαῦρος *lizard*, indicative of the narrow space between the temporal fossæ, which he believed to be peculiar to the fossil Crocodiles to which he assigned it: he believed also that these Crocodiles differed from the *Teleosauri* and other species with biplane or sub-biconcave vertebræ, in having the bony nasal canal prolonged to beneath the occipital condyle. Both these suppositions have been proved incorrect by later discoveries; but the name *Steneosaurus* is retained for those amphicœlian Crocodiles with the external bony nostril subterminal and oblique. (See Cuvier, Ossem. Foss., tom. v. pt. 2. pl. x. fig. 5 and 6.)

40. A coloured plaster cast of the maxillary or facial part of the skull of the *Steneosaurus robustus.* It shows the form and position of the external nostril that chiefly distinguish the cranium of this genus from that of the *Teleosaurus.* In the original the upper jaw has been obliquely fractured by partial movements of the imbedding stratum.

The original is from the middle oolite of Oxfordshire.

Presented by Sir Henry De la Beche, F.R.S.

41. A coloured plaster cast of a considerable portion of the left ramus of the lower jaw of the same *Steneosaurus.* The symphysis, as in the Gavial, is almost co-extensive with the dental series.

The original is from the middle oolite of Oxfordshire.

Presented by Sir Henry De la Beche, F.R.S.

42. A coloured plaster cast of the hinder half of the right ramus of the lower jaw of the *Steneosaurus robustus.* The articular surface is convex in the middle and concave on each side, not uniformly concave as in the modern Gavial: the depth of the ramus at the coronoid ridge is greater, and the ridge itself is higher than in the Gavial: there is no vacant space between the angular and surangular elements. The splenial piece has been detached from the original of this cast.

The original is from the middle oolite of Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

43. The centrum of a dorsal vertebra of an amphicœlian Crocodile, probably allied to the *Steneosaurus.* The neurapophyses have not been anchylosed to the centrum; the broad, rough articular surfaces for those elements meet and obliterate the neural surface at the middle of the centrum.

From an oolitic formation beneath a bed of gravel at Manstone, Dorset.

Presented by William Cunnington, Esq.

Genus *Goniopholis**.

44. The body of a cervical vertebra of the *Goniopholis carinatus.* The bases of the neurapophyses have adhered to the centrum, but traces of the sutures are manifest. The inferior surface of the centrum is divided by a longitudinal

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* From the Greek *γωνία angle, φολὶς scute*; in relation to the angular form of the bony dermal scutes in this genus of extinct Crocodile.

median ridge into two concavities. The fore-part of the centrum is flat; the hinder surface is slightly concave.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

45. The centrum with the anchylosed base of the neural arch of the *Goniopholis carinatus.*

The inferior ridge is sharper and more developed than in the preceding specimen.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

46. A similar but more mutilated specimen of a cervical vertebra of the same *Goniopholis carinatus.*

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

47. The centrum and anchylosed bone of the neural arch of a posterior cervical vertebra of the same *Goniopholis carinatus.* The parapophysis has risen to the line of the neurapophysial suture. The inferior surface of the centrum is carinate.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

48. The centrum and anchylosed base of the neural arch of a dorsal vertebra of the same *Goniopholis carinatus.* It is carinate below and more compressed than in the foregoing vertebra: the parapophysis has disappeared from the centrum.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

49. The proximal end of the right humerus of the *Goniopholis crassidens.* The pectoral ridge extends to the proximal articular surface, and is of greater breadth than in the modern Crocodile.

From the Wealden deposits near Horsham, Sussex.

Presented by G. B. Holmes, Esq.

50. The shaft of probably the same humerus of the *Goniopholis crassidens.*

From the Wealden deposits near Horsham, Sussex.

Presented by G. B. Holmes, Esq.

51. The distal end of the left femur of the *Goniopholis crassidens.*

It shows the ridge produced from behind the outer condyle. The fractured part of shaft exposes the small medullary cavity.

From the Wealden deposits near Horsham, Sussex.

Presented by G. B. Holmes, Esq.

52. The crowns of two teeth of the *Goniopholis crassidens.*

From the Wealden deposits of Sussex.

Presented by Professor Owen, F.R.S.

53. The crown of a tooth of an extinct Crocodile, nearly allied to, if not, the *Goniopholis crassidens.*

The enamelled crown is traversed by fine longitudinal and slightly wavy ridges resembling those of the *Madrimosaurus*: the cement-covered, circular base of the tooth is smooth: the pulp-cavity is widely open and filled with the oolitic matrix.

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

54. A tray of teeth of the *Goniopholis crassidens.*

From the Purbeck strata near Swanage, Dorsetshire.

Presented by Charles Wilcox, Esq., M.R.C.S.

Genus *Suchosaurus.*

55. A portion of conglomerate rock with part of the crown of a tooth of the *Suchosaurus.*

From the Wealden formations of Sussex.

Presented by Prof. Owen, F.R.S.

Genus *Hyposaurus**.

56. The centrum of a posterior cervical vertebra of the *Hyposaurus Rogersii.* The reduced parapophysis projects close to the upper surface of the centrum, midway between its articular extremities. The hypapophysis is a ridge deve-

* From the Greek ὑπὸ *beneath,* σαῦρος *lizard*; in reference to the peculiar development of the inferior vertebral processes, or 'hypapophyses' in this genus of extinct Crocodile.

loped from nearly the whole of the under surface of the centrum. The neurapophysial surfaces approximate to within two lines of each other above the middle of the centrum.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

57. A coloured plaster cast of an anterior dorsal vertebra of the *Hyposaurus Rogersii.*

The parapophyses have almost merged in the neurapophysial surfaces. A greater proportion of the carinate hypapophysis is here preserved.

The original is from the green-sand formations of New Jersey, United States. *Presented by Prof. H. Rogers.*

Genus *Cœlosaurus**.

58. A mutilated centrum of a dorsal vertebra of the *Cœlosaurus.*

The neurapophyses have coalesced with the centrum, but the arch is broken off: the contour of the articular ends of the centrum is subcircular, and they are both regularly and pretty deeply concave. The free surface of the centrum is longitudinally concave between the articular ends. The bone presents a compact cellular structure, and is completely petrified.

It has been probably washed out of an upper oolitic stratum, and is from the Drift of West Norfolk.

Presented by C. B. Rose, Esq., F.R.C.S.

Genus *Poikilopleuron*†.

59. One-half of the centrum of a dorsal vertebra of the *Poikilopleuron Bucklandii.*

The articular extremity here preserved is elliptical with the long diameter vertical, and is slightly concave: the middle of the centrum is contracted: the fractured surface exposes a medullary cavity surrounded by large cancellous vacuities, which have become filled with siliceous spar and pyritic matter:

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* From the Greek *κοῖλος hollow, σαῦρος lizard*; in reference to the unusual depth of the subconcave articular surfaces of the vertebræ in this Crocodilian genus.

† A name devised by M. Eudes-Deslongchamps, from the Greek *ποικίλος varied, πλευρὸν rib,* to signify that the ribs vary in structure in the skeleton of this reptile.

there is a small depression on each side near the base of the neural arch which seems to lead, like a pneumatic foramen, into the cavities of the bone. The thin outer wall of this unusual structure consists of very compact osseous matter.

From the submerged Wealden beds at Brook Point, Isle of Wight.

Presented by Prof. Owen, F.R.S.

60. A mutilated vertebra of the *Poikilopleuron Bucklandii.*

The articular extremities of the centrum have been subject to abrasion, but the oblique surface at the lower part of the posterior one appears to indicate an articulation for a hæmal arch, characteristic of a caudal vertebra.

From the submerged Wealden beds off Brook Point, Isle of Wight.

Presented by Alexander Duff, Esq.

c. With prospherian vertebræ; or those that have the anterior articular surface of the body convex, the posterior one concave.

Genus *Streptospondylus*[*].

61. A vertically bisected cervical or anterior dorsal vertebra of the *Streptospondylus Meyeri.*

The anterior articular end of the centrum is convex, the posterior one concave. The parapophysis projects immediately behind the anterior ball, and presents a slight concavity for the head of the rib. Above it is a deep, oblique depression entering the side of the centrum. The diapophysis extends from near the fore-part of the base of the neural arch obliquely downwards and backwards, and is strengthened by an oblique ridge abutting against its posterior surface, and dividing two deep depressions in the side of the neurapophysis. The texture of this vertebra offers the same medullary cavity in the centrum and surrounding open cancellous structure, with thin compact walls, as in the

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[*] From the Greek *στρέφω I turn, σπόνδυλος vertebra*; in allusion to the reversed position of the cup and ball surfaces of the cervical and anterior dorsal vertebræ, as compared with existing Crocodiles. The Saurian with this modification of the vertebral column was first made known by Cuvier, in the 'Bulletin de la Société Philomathique,' 1801, p. 159; and in the 'Annales du Muséum,' tom. xii. p. 83, under the name of the '1^re^ Gavial de Honfleur.'

Poikilopleuron, and it is probable that the Streptospondylian characters may be peculiar modifications of the cervical vertebræ of that genus.

From the submerged Wealden beds, off Brook Point, Isle of Wight.

Presented by Prof. Owen, F.R.S.

62. A centrum, with the anchylosed bases of the neural arch, of a cervical vertebra, having articular surfaces, characteristic of the genus *Streptospondylus*.

The anterior convexity is irregular, the posterior concavity is more equal; the inferior surface is compressed into a strong rounded ridge, and a similar ridge extends from each side to the parapophysis, which slightly projects close to the margin of the anterior convex surface, and presents an oval shallow concavity for the head of the rib. The inferior and lateral ridges are divided by deep concavities, and a still larger and deeper concavity separates the lateral ridge from the base of the neurapophyses, extending obliquely forwards and inwards. Traces of the suture may be discerned above this concavity. The transverse diameter of the centrum at the back part is 4 inches 6 lines: the length of the centrum is 4 inches 7 lines. The posterior diameter of the neural canal is 1 inch 5 lines. The smooth and polished free surface of this vertebra corresponds best with the character of that part in the *Megalosaurus*, and the cervical vertebræ of that reptile may present the same modifications which have been suspected to characterize the same vertebræ in the *Cetiosaurus* and *Poikilopleuron**.

The matrix adhering to the specimen is an oolitic stone resembling that of Stonesfield, but the locality of this specimen has not been recorded.

Hunterian.

Genus *Cetiosaurus*†.

63. The body of a dorsal vertebra of a small *Cetiosaurus*. The anterior articular surface is subconcave, the posterior one is flat.

From the submerged Wealden beds, off Brook Point, Isle of Wight.

Presented by Frederick Dixon, Esq.

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* Report on British Fossil Reptiles, 1841, p. 96.

† From the Greek κῆτος *whale*, σαῦρος *lizard*; in reference to the resemblance of this genus to the whale in the structure of the bones, and the enormous size of some of the species.

64. A centrum, with the anchylosed bases of the neural arch, of a caudal vertebra of the *Cetiosaurus medius.*

The back part of the under surface shows the articular prominences for the hæmapophyses : the articular surface at this end is concave, with an irregular projection from its lower part ; the anterior surface is irregularly convex. The neurapophyses are attached to near this end of the centrum, their base being half the length of that part.

From the lower oolitic formations of Chipping Norton.

Presented by W. Stone, Esq.

Genus *Polyptychodon**.

65. A fragment of the base of a tooth of the *Polyptychodon interruptus.*

The widely open pulp-cavity is filled with the matrix : a portion of the enamel with the characteristic longitudinal ridges indicates the genus. The circumference of the base of the crown of this tooth has exceeded four inches.

From the Upper Green-sand deposits near Barnwell, Cambridgeshire.

Presented by James Carter, Esq., F.R.C.S.

66. A transverse section of the middle of the shaft of the femur of the *Polyptychodon interruptus.* It shows the absence of a medullary cavity, and the moderately fine cancellous structure which occupies the middle of the long bones in this large, extinct, marine Saurian.

From the Upper Green-sand formation near Hythe, in Kent.

Presented by H. B. Mackeson, Esq.

Order DINOSAURIA†.

(Great Saurians : body supported on four well-developed unguiculate limbs : sacrum composed of more than two vertebræ : two transverse processes on each side of the cervical and anterior dorsal vertebræ. To this Order belong the following huge reptiles of the Wealden formations, viz. the Megalosaurus, Iguanodon, and Hylæosaurus, which are characterized by the modifications of the limbs and pelvis, that fitted them for more efficient progression upon dry land. The Iguanodon represented the herbivorous section of the Order; the Hylæosaurus appears, from its teeth, to have been a mixed feeder; but the Megalosaurus was decidedly carnivorous, and probably waged a deadly war against its less destructively endowed congeners and contemporaries.

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* From the Greek πολὺς *many,* πτὺξ *a fold* or *ridge* ; in reference to the numerous narrow folds or ridges upon the enamel of the teeth.

† From the Greek δεινὸς *terribly great,* σαῦρος *a lizard.*

Genus *Megalosaurus.*

The Megalosaurus, as its name implies (compounded by its discoverer, Dr. Buckland, from the Greek μέγας *great,* and σαῦρος *lizard*), was a lizard-like reptile of great size, "of which," writes Dr. Buckland, "although no skeleton has yet been found entire, so many perfect bones and teeth have been discovered in the same quarries, that we are nearly as well acquainted with the form and dimensions of the limbs as if they had been found together in a single block of stone."

67. A coloured plaster cast of a posterior dorsal or lumbar vertebra of a *Megalosaurus Bucklandi.*

The non-articular surface is remarkably smooth and polished. The body is much contracted in the middle: the margins of the expanded articular extremities are thick and rounded off. The middle contracted part of the body is nearly cylindrical, being nipped in, as it were, by a more or less deep longitudinal fossa on each side, just below the base of the neural arch, but again slightly expands to support that part. The length of the base of the neurapophysis is nearly equal to that of the centrum: the suture is persistent, as in Crocodiles. The neurapophysis ascends and inclines outwards, to form the margin of a broad platform of bone, from the sides of which the transverse processes are developed, and from the middle part the spinous process.

From the Wealden formations at Stammerham, Sussex.

Presented by George B. Holmes, Esq.

68. The centrum of the dorsal vertebra of a young *Megalosaurus Bucklandi,* showing the neural canal in the form of an angular groove between the extended sutural surfaces for the neurapophyses.

From the ferruginous Wealden sand near Battle, Sussex.

Presented by the Very Rev. Dr. Buckland, F.R.S.

69. The centrum and part of the coalesced neural arch of a caudal vertebra of the same young *Megalosaurus Bucklandi.* The articular ends have a subhexagonal contour and are impressed by the hypapophysial surfaces, of which the hinder one is the largest.

From the ferruginous Wealden sand near Battle, Sussex.

Presented by the Very Rev. Dr. Buckland, F.R.S.

70. A more posterior caudal vertebra of apparently the same young *Megalosaurus Bucklandi,* with part of the neural canal. The transverse exceeds the vertical diameter of the articular terminations of this vertebra.

From the ferruginous Wealden sand near Battle, Sussex.

Presented by the Very Rev. Dr. Buckland, F.R.S.

71. A portion of a neurapophysis with one of the zygapophyses of the *Megalosaurus Bucklandi.*

From the ferruginous Wealden sand in the neighbourhood of Battle, Sussex. *Presented by the Very Rev. Dr. Buckland, F.R.S.*

72. The right femur of the *Megalosaurus Bucklandi.* The head is compressed: the great trochanter, of considerable longitudinal extent, commences six inches from the summit of the head, from the outer and back part of the bone, and is bent backwards: the inner trochanterian ridge commences at the opposite side of the shaft about six inches below this. The medullary cavity is filled principally with siliceous spar: the lower end of the bone expands and forms two condyles, divided by a shallow longitudinal concavity in front and by a broader and deeper concavity behind. The back part of the left condyle, and both the fore and back part of the right condyle, are broken away.

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

73. The shaft of the femur of the *Megalosaurus Bucklandi.* It measures 12 inches 8 lines in circumference at the narrowest part. The medullary cavity is filled partly by siliceous spar, partly by the oolitic matrix, from which we may infer that the bone was broken before it was petrified. The shape of the medullary cavity at the middle of the shaft is a full oval.

The thick, low, trochanterian process extends from near the proximal end of the fragment. From these and other specimens subsequently obtained from Stonesfield, and preserved in the British Museum, we find that the femur of the *Megalosaurus,* like the teeth and vertebræ, exhibits a mixture of the characters of the Monitor and the Crocodile. It is arched in two directions, being at first concave in front, and then behind. Its articular head is directed forwards, and has behind it a compressed and rather salient trochanter; it thickens towards the distal end, and there terminates in two unequal condyles. Near its upper third it has an expansion on both the inner and the outer side, like the one which is seen on the internal side of the femur in the Crocodile. The femur of the Monitor is less arched. The medullary canal is wide, which removes the Megalosaur from the Crocodiles, and indicates, as Dr. Buckland has well shown, its aptitude for a more terrestrial life.

From the oolitic slate at Stonesfield, Oxfordshire. *Hunterian.*

74. The left tibia of the *Megalosaurus Bucklandi.*

In the Hunterian MS. Catalogue this specimen is described as "a very large entire thigh-bone of an animal of vast magnitude: the cavity or medullary part is filled with spar; the bony part is petrified and solid; it is broken in three pieces: (bought at Humphrey's sale)."

The length of this fine bone is 30 inches; the breadth of the proximal end 8½ inches; of the distal end 8 inches; circumference of the middle of the shaft 11 inches 2 lines.

The proximal end is of an irregular oblong figure, narrowest where it is continued from behind, forward and outwards upon the summit of the procnemial ridge. This ridge is proportionally more produced than in the modern Lizards, and is slightly bent outwards, leaving a wide concavity towards the fibula. The fore-part of the proximal end of the bone is slightly and rather irregularly convex: the ridge for the attachment of the great adductor muscle comes off more from the back part of the shaft, than from the inner part, as in the Monitors and Iguanas, and it is proportionally much more strongly developed. Below this ridge the bone contracts to near the ordinary size of the shaft, with the circumference above-mentioned. It is convex at the fore-part, flattened behind, and the medullary cavity partakes of the same shape. The thickness of the compact wall of the cavity varies from an inch and a half to two-thirds of an inch. The bone begins to expand about eight inches from the distal end, and is produced and compressed to an edge at the inner malleolar part. The outer surface retains its convexity, and a strong ridge is continued from the outer malleolus obliquely upwards on the back part of the expanded distal end.

From the oolitic formations at Stonesfield, Oxfordshire. *Hunterian.*

75. The shaft and distal end of apparently a metatarsal bone of the *Megalosaurus Bucklandi.*

It is broken in three pieces, and displays a small medullary cavity filled with spar at the middle of the shaft. The distal end is convex: the shape of the shaft, semicircular above the middle, becomes trihedral near the distal end.

Locality unnoted, but probably from Stonesfield. *Hunterian.*

76. A coloured plaster cast of a middle phalanx of a large Saurian reptile, probably the *Megalosaurus.* The original is from the oolitic slate of Stonesfield, Oxfordshire, and in the museum of the donor of the cast.

Presented by the Very Rev. Dr. Buckland, F.R.S.

77. A coloured plaster cast of a portion of Wealden stone, in which is imbedded the ungual phalanx of a large Saurian, probably *Megalosaurus.* It is long, subcompressed, curved and pointed, with a deep groove along the exposed side.

From the Wealden formations of Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

78. A coloured plaster cast of an ungual phalanx wanting the apex, of the *Megalosaurus.* It differs from that of the Iguanodon in its more compressed and curved form.

The original is from the Wealden formations of Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

79. A polished section of a fragment of a rib of the *Megalosaurus,* showing compact, concentrically laminated bony structure.

Locality unnoted. *Hunterian.*

80. A slab of oolitic sandstone in which is imbedded a fragment of a rib of the *Megalosaurus Bucklandi.*

Locality unnoted. *Hunterian.*

81. A block of oolitic slate, with a portion of a long, slightly curved, compressed bone of the *Megalosaurus.*

Locality unnoted, but from the nature of the matrix it is most probably from Stonesfield, Oxfordshire. *Hunterian.*

82. A block of Stonesfield slate containing the crown of a tooth of the *Megalosaurus Bucklandi.* The serrated border on the concave trenchant edge and on the

apical half of the convex edge of the crown are plainly shown, and the characteristic form of the tooth of this large carnivorous reptile is well displayed.

From the oolitic formations at Stonesfield, Oxfordshire. *Hunterian.*

83. Fragments of the crown of a tooth of the *Megalosaurus*, from which a section has been taken to demonstrate the compact structure of the dentine.

From the oolitic formations at Stonesfield, Oxfordshire.

Presented by Prof. Owen, F.R.S.

Baron Cuvier estimated the Megalosaurus to have been about fifty feet in length; my own calculations, founded on more complete evidence than had been at the Baron's command, reduce its size to about thirty-five feet: but with the superior proportional height and capacity of trunk, as contrasted with the largest existing crocodiles, even that length gives a most formidable character to this extinct predatory reptile.

As the thigh-bone (*femur*) and leg-bone (*tibia*) measure nearly three feet, the entire hind-leg, allowing for the cartilages of the joints, must have attained a length of two yards: a bone of the foot (*metatarsal*) thirteen inches long, indicates that part, with the toes and claws entire, to have been at least three feet in length. The form of the teeth shows the Megalosaurus to have been strictly carnivorous, and viewed as instruments for providing food for so enormous a reptile, the teeth were fearfully fitted to the destructive office for which they were designed. They have compressed conical sharp-pointed crowns, with cutting and finely serrated anterior and posterior edges; they appear straight, as seen when they had just protruded from the socket, but become bent slightly backwards in the progress of growth, and the fore-part of the crown, below the summit, becomes thick and convex.

A minute and interesting description of these teeth will be found in Dr. Buckland's 'Bridgewater Treatise' (vol. i. p. 238), from which he concludes that the teeth of the Megalosaurus present "a combination of contrivances analogous to those which human ingenuity has adopted in the construction of the knife, the sabre, and the saw." The fossils which brought to light the former existence of this most formidable reptile, were discovered in 1823, in the oolitic slate of Stonesfield, near Oxford, and were described by Dr. Buckland in the volume of the 'Geological Transactions' for the year 1824. The parts of the Megalosaurus obtained by Hunter were from the same formation and locality.

Remains of the Megalosaurus have since been discovered in the "Bath oolite," which is immediately below the Stonesfield slate, and in the "Cornbrash" which lies above it. Vertebræ, teeth, and some bones of the extremities have been discovered in the Wealden of Tilgate Forest, Kent, and in the ferruginous sand, of the same age, near Cuckfield, in Sussex. Remains of the Megalosaurus occur in the Purbeck limestone at Swanage Bay, and in the oolite in the neighbourhood of Malton in Yorkshire.

Genus *Hylæosaurus**.

84. A portion of Wealden stone in which is partially imbedded a tooth of the *Hylæosaurus Owenii.* The margins of the elongated subcompressed crown have been worn by attrition against the opposite tooth; the base is subcylindrical, and is not contracted as it recedes from the crown.

From the Wealden formations of Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

Genus *Iguanodon*†.

85. The body of a dorsal vertebra of a young *Iguanodon Mantelli.*

These vertebræ have their bodies terminated by flat or slightly concave articular surfaces, and their sides flat or slightly convex vertically, moderately concave lengthwise or in the axis of the vertebra; the sides converge more or less towards the under surface, and the body accordingly presents more or less the form of a wedge, with its edge obtuse or flattened.

From the Wealden formations near Battle, Sussex.

Presented by Sir Roderick Impey Murchison, P.G.S.

86. The body of a sacral vertebra of the *Iguanodon Mantelli.*

Its characteristics are seen in the two partial neurapophysial surfaces on each side of the upper half of the centrum, indicative of the change of position of the neurapophyses to above the interspace between their proper centrum and the adjoining one. The spinal nerve accordingly passes over the middle of the centrum, which is grooved for its escape. The articular ends are rough for ligamentous attachment, which is obliterated by anchylosis in older individuals.

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* The name of this extinct Reptile was devised from the Greek ὕλη *wood*, σαῦρος *lizard*, in reference to the locality in which its remains are chiefly discovered, viz. the ancient Wood or Wold of Sussex.

† A name suggested by Conybeare to express the resemblance of the teeth of this gigantic Herbivorous Reptile to those of the Iguana (*Iguana*, and ὀδοὺς *a tooth*).

From the Wealden formations of Sussex.

Presented by Prof. Owen, F.R.S.

87. The body of an anterior caudal vertebra, rolled and water-worn, of a large *Iguanodon Mantelli*.

Its characteristics are still traceable in its flat sides, converging towards its under surface, and in the single, large, oblique, hæmapophysial facet at the fore and back part of that surface.

From the submerged Wealden beds, off Brook Point, Isle of Wight.

Presented by Frederick Dixon, F.G.S.

88. The body with the coalesced bases of the neurapophyses of one of the posterior caudal vertebræ of the *Iguanodon Mantelli*.

The single hæmapophysial surface is largest and best marked at the back part of the under surface. The diapophysis is represented by a slight prominence on each side of the centrum, whence those sides converge to the inferior surface. The matrix shows well the form of the neural canal.

From the Wealden, near Battle, Sussex.

Presented by Sir Roderick Impey Murchison, P.G.S.

89. The body of a posterior caudal vertebra, with part of the neural arch broken and displaced, probably of the *Iguanodon Mantelli*: it shows the single articular surface on the anterior and posterior parts of the centrum.

From the Wealden, near Battle, Sussex.

Presented by Sir Roderick Impey Murchison, P.G.S.

90. The body and coalesced bases of the neural arch of a posterior caudal vertebra of the same reptile, probably the *Iguanodon Mantelli*.

From the Wealden, near Battle, Sussex.

Presented by Sir Roderick Impey Murchison, P.G.S.

In this and the foregoing specimen the diapophysis appears to be represented by a ridge which traverses the centrum lengthwise at its upper third, whence the sides converge towards the inferior surface, and so far exhibit a characteristic feature of the vertebræ of the Iguanodon.

91. A slightly mutilated centrum, with the attached bases of the neurapophyses, of a more posterior caudal vertebra of a larger individual, probably of the *Iguanodon Mantelli.*

The hæmapophysial surfaces are single on both the fore and back part of the centrum, and are most developed on the latter. A pair of parallel ridges, with a deep but narrow intervening groove, extends from one to the other surface. The articular ends of the centrum are slightly concave.

From the Wealden formations of Sussex.

Presented by the Very Rev. Dean Conybeare, F.R.S.

92. A plaster cast of the proximal end of a thoracic rib of the *Iguanodon Mantelli.*

It shows a distinct head and tubercle, with an intervening neck of seven inches in extent. The outer margin of the body of the rib is convex, expanded and produced on each side, so as to overhang the rest of the body of the rib, indicating in a minor degree the expansion of the thoracic ribs in the Chelonians. No existing reptiles, save the Crocodilia, have the thoracic ribs articulated at two points by a head and tubercle, and this structure is associated with a complete septum ventriculorum, whence we may infer that the Iguanodon possessed a similar advanced structure of the central organ of circulation.

The original is from the Wealden formations of Stammerham, Sussex.

Presented by G. B. Holmes, Esq.

93. A portion of one of the thoracic ribs of the *Iguanodon Mantelli*, showing the expansion and projection of the outer convex surface near the proximal end of the rib.

Locality unnoted; probably from the Wealden of Sussex. *Hunterian.*

94. A coloured plaster cast of the humeral portion of the coracoid of the *Iguanodon Mantelli.* It shows the deep and dilated groove which divides the articular surface for the scapula from that for the head of the humerus.

The original is from the Wealden of Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

95. The left femur of the *Iguanodon Mantelli*.

It measures 3 feet 1 inch in length: its circumference at the middle of the shaft is 18 inches: the contour of the rounded inward-projecting part of the head is 17½ inches: two flat longitudinal facets meet near the middle of the anterior surface of the shaft at a rough and slightly elevated angle, which runs straight down to within 13 inches of the distal end: the ridge there inclines towards the internal condyle and subsides. Two strong *vasti internus et externus* muscles are indicated by this ridge. The head of the bone is carried inwards, overhanging the shaft in a greater degree than the corresponding part does in the humerus. The line of the inner side of the shaft describes a graceful sinuous curve, being first concave, then slightly convex at the middle, where there is the projecting ridge formed by the base of the internal trochanter, which has been broken off: below this it is concave, and so continues to the flattened, antero-posteriorly extended, slightly concave surface, which descends vertically to the articular surface of the condyle, part of which is here broken away. The antero-posterior extent of the remains of this flattened condyle is 8 inches. Both ends of this fine bone are crushed and mutilated.

From the Wealden formations of Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

96. A transverse section from near the middle of the shaft of the femur of the *Iguanodon Mantelli*, showing the calibre and form of the medullary cavity. The thickness of the compact wall of this cavity varies from an inch and a half to half an inch.

From the Wealden formations at Brook Point, Isle of Wight.

Presented by Prof. Owen, F.R.S.

97. A coloured plaster cast of a proximal phalanx of probably the left fore-foot of the *Iguanodon Mantelli*.

The original is from the Wealden Iron-sand which forms the shore of the Isle of Wight, east of Sandown Fort. This specimen is figured and described as a 'metacarpal bone' in the 'Geological Transactions,' vol. iii. 2nd series, p. 425: it does not exhibit, however, any articular facet at the side of the proximal end for junction with a contiguous metacarpal, and the distal end, instead of a uniform convexity, presents the trochlear combination of a vertical convexity with a transverse concavity. The inference, therefore, as to the metacarpal bones of the Iguanodon being much shorter and thicker than in any living Crocodiles or Lizards, receives no support from the proportions of the present specimen.

The following is the notice of the original specimen, in the memoir by the *Donor, the Very Rev. Dr. Buckland, F.R.S.*

"The first of these two new localities is on the south coast of the Isle of Wight, in the iron-sand which forms the shore, a little east of Sandown Fort, between high and low water. The most remarkable specimen I possess from thence is the gigantic metacarpal bone about to be described. The form of this bone nearly resembles one in the collection of Mr. Mantell, which Cuvier saw, and pronounced to be a metacarpal bone of the thumb of a reptile; but much exceeds it in size, measuring 6 inches in length, 5 inches in width at its largest diameter, and 16 inches in circumference at its posterior and largest extremity. Its weight is nearly six pounds.

"It is, I believe, the largest metacarpal bone which has been as yet discovered; and if we apply to the extinct animal from which it was derived, the scale by which the ancients measured Hercules ('*ex pede Herculem*'), we must conclude that the individual of whose body it formed a part, was the most gigantic of all quadrupeds that have ever trod upon the surface of our planet. The corresponding bone in the foot of the largest Elephant is less than our fossil metacarpal by more than one half. The bone represented by Mr. Mantell (plate 14. fig. 4, 5 of his 'Fossils of Tilgate Forest') approaches the nearest of all those engraved by him in this work, to our bone from Sandown Bay. He considers his fossil to be most probably a metatarsal bone of the Iguanodon, and states that he has one such bone which measures 4½ inches in length, and 13 inches in circumference at the largest tarsal extremity. The colossal proportions of a fragrant of a femur in his possession, from Tilgate Forest (plate 18. fig. 1 of the same work), which measures 23 inches in circumference in the smallest part, sufficiently accord with those of his metatarsal bone last mentioned, as well as our metacarpal bone from the same formation in the Isle of Wight; and give strong probability to the opinion that all these three fragments of the skeleton of a reptile of such extraordinary stature may be referred to the Iguanodon. It is obvious that these supposed metacarpal and metatarsal bones are much shorter and thicker in their proportions, than the metacarpal or metatarsal bones of any living lizards or crocodiles; but when we consider the enormous weight which the foot of an animal whose femur was 23 inches in circumference must have sustained, a reduction of length and increase of bulk in the bones which supported such a colossal frame, must have been attended with many mechanical advantages."—p. 426.

98. A plaster cast of a middle phalanx of one of the toes of the *Iguanodon Mantelli.* It is very short in proportion to its breadth and depth, with a trochlear surface slightly concave vertically, and convex transversely behind and the reverse in front.

The original is from the Wealden clay of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

99. A coloured plaster cast of an ungual phalanx of a young *Iguanodon Mantelli.* In its subdepressed form, in the expansion of the convex margins below the vascular grooves, and its comparative obtuseness, it shows well the characteristics of the form of the phalanx in this large extinct herbivorous reptile.

The original is from the Wealden clay of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

100. A coloured plaster cast of the ungual phalanx of a young *Iguanodon Mantelli,* showing its characteristic depressed obtuse form.

From the submerged Wealden beds, off Brook Point, Isle of Wight.

Presented by Prof. Owen, F.R.S.

101. A coloured plaster cast of an ungual phalanx, with the extremity broken off, of the *Iguanodon Mantelli.*

It is, perhaps, from the hind foot, being less broad in proportion to its depth than in the preceding specimens.

The original is from the Wealden formations of Stammerham, Sussex.

Presented by George B. Holmes, Esq.

102. A coloured plaster cast of the ungual phalanx of a large *Iguanodon Mantelli.*

The original is from the Wealden formation, off Brook Point, Isle of Wight.

Presented by the Very Rev. Dr. Buckland, F.R.S.

103. A plaster cast of an ungual phalanx of the *Iguanodon Mantelli* : it is somewhat

smaller and more oblique than the preceding, and is probably from a toe nearer one or other of the sides of the foot.

The original is from the Wealden formations, off Brook Point, Isle of Wight.

Presented by J. D. Saull, Esq., F.G.S.

104. A coloured plaster cast of an ungual phalanx. It presents the subdepressed form of some of those of the *Iguanodon*, but from its size it may have belonged to the *Hylæosaurus*.

The original is from the Wealden formations, off Brook Point, Isle of Wight.

Presented by Prof. Owen, F.R.S.

105. A conical ungual phalanx of a large reptile, probably from an outer toe of the *Iguanodon*.

It has an irregular, slightly concave base, broader than it is high, and has a well-marked deep vascular groove on each side: that to the left sinks into the substance of the bone as it approaches the apex, where it communicates with several large vascular foramina: the upper surface between these grooves is narrower and less convex than the under one.

The original is from the Wealden of Battle, Sussex.

Presented by Felix Knyvett, Esq.

106. A plaster cast of an ungual phalanx of a large reptile, probably from an outer toe of the *Iguanodon*.

It is of an unsymmetrical, conical form, with an irregular slightly concave basal articulation, and with impressions of two lateral vascular grooves. It resembles that phalanx which has been described as the horn of the *Iguanodon* (Philosophical Transactions, 1841, pl. 9. fig. 2).

The original is from the Wealden of Battle, Sussex.

Presented by Felix Knyvett, Esq.

107. A coloured plaster cast of a portion of Wealden stone, in which is imbedded a similar but smaller, unsymmetrical, conical phalanx, of the same reptile.

From the Wealden of the south coast of Sussex.

Presented by Felix Knyvett, Esq.

108. A portion of the shaft of apparently a metatarsal bone of a Dinosaurian reptile, showing a trace of a medullary cavity filled with spar at the larger end.

Locality unnoted. *Hunterian.*

109. The extremity of a long bone of a Dinosaurian reptile. The compact walls at the broken surface are from 3 to 5 lines in thickness, the rest of the bone being occupied by a rather close cancellous texture; but the orifice and canal of a medullary artery are exposed, which appears to have led to the beginning of a medullary cavity, where a small portion of spar has been deposited.

Locality unnoted, but probably from Stonesfield, Oxfordshire. *Hunterian.*

110. A portion of Wealden clay, with the tooth of a young *Iguanodon Mantelli.*

From the sandstone of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

111. The crown of the tooth of the *Iguanodon Mantelli.* The apex has been slightly worn by attrition against the opposite tooth; the ridged anterior surface and crenate margins of the tooth are well shown.

From the Wealden formations of Tilgate Forest, Sussex.

Presented by the Very Rev. Dr. Buckland, F.R.S.

112. A portion of Wealden clay, with a much-worn tooth of the *Iguanodon Mantelli.*

From the sandstone of Tilgate Forest, Sussex.

Presented by Prof. Owen, F.R.S.

113. A much-worn and shed tooth of the *Iguanodon Mantelli.*

The base has been obliquely excavated by the absorbent action: the crown is worn flat.

From the Wealden formation at Tilgate Forest, Sussex.

Presented by Prof. Owen, F.R.S.

114. A portion of conglomerate ferruginous rock, in which is imbedded part of a tooth of the *Iguanodon Mantelli.*

From the Wealden formations of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

115. A coloured plaster cast of a portion of Wealden clay, in which is partially imbedded a tooth of the *Iguanodon Mantelli.*

It is of large size, with the crown worn down to a flattened surface, and the fang contracted.

The original is from the Wealden clay of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

116. A plaster cast of a portion of Wealden stone with a tooth of the *Iguanodon Mantelli.*

It shows the curvature of the tooth; the contracted cylindrical base; the notched lateral border, and trenchant upper edge of the broad enamelled crown, which had been a little obliquely worn.

The original is from the Wealden of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

117. A plaster cast of a portion of Wealden stone, with a tooth of the *Iguanodon Mantelli.*

It is completely formed, and the crown has been worn down to a broad triturating surface, characteristic of this extinct herbivorous reptile.

From the Wealden formations of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

118. A plaster cast of a portion of Wealden stone, with the crown of a tooth of an *Iguanodon Mantelli.*

It shows the finely notched margins and trenchant border of the crown at the commencement of its coming into use.

The original is from the Wealden of Tilgate Forest, Sussex.

Presented by Dr. Gideon A. Mantell, F.R.S.

The teeth of the Iguanodon were the first indications of this remarkable extinct animal, and are thus noticed in the original memoir on the Iguanodon by Dr. Mantell, in the 'Philosophical Transactions' for 1825.

"As these teeth were distinct from any that had previously come under my notice, I felt anxious to submit them to the examination of persons whose knowledge and means of observation were more extensive than my own. I therefore transmitted specimens to some of the most eminent naturalists in this country and on the continent. But although my communications were acknowledged with that candour and liberality which constantly characterize the intercourse of scientific men, yet no light was thrown upon the subject, except by the illustrious Baron Cuvier, whose opinions will best appear by the following extract from the correspondence with which he honoured me:—

"'These teeth are certainly unknown to me; they are not from a carnivorous animal, and yet I believe that they belong, from their slight degree of complexity, the notching of their margins, and the thin coat of enamel that covers them, to the order of reptiles.

" 'May we not here have a new animal!—a herbivorous reptile? And, just as at the present time with regard to mammals (land-quadrupeds with warm blood), it is amongst the herbivorous that we find the largest species, so also with the reptiles at the remote period when they were the sole terrestrial animals, might not the largest amongst them have been nourished by vegetables?

" 'Some of the great bones which you possess may belong to this animal, which, up to the present time, is unique in its kind. Time will confirm or confute this idea, since it is impossible but that one day a part of the skeleton, united to portions of jaws with the teeth, will be discovered.' "

"These remarks," Dr. Mantell proceeds to say, "induced me to pursue my investigations with increased assiduity, but hitherto they have not been attended with the desired success, no connected portion of the skeleton having been discovered. Among the specimens lately collected, some, however, were so perfect, that I resolved to avail myself of the obliging offer of Mr. Clift (to whose kindness and liberality I hold myself particularly indebted), to assist me in comparing the fossil teeth with those of the recent Lacertæ in the Museum of the Royal College of Surgeons. The result of this examination proved highly satisfactory, for in an Iguana which Mr. Stutchbury had prepared to present to the College, we discovered teeth possessing the form and structure of the fossil specimens." (Phil. Trans. 1825, p. 180.) And he afterwards adds :—"The name *Iguanodon*, derived from the form of the teeth (and which I have adopted at the suggestion of the Rev. W. Conybeare), will not, it is presumed, be deemed objectionable." (Ib. p. 184.)

The further discovery which verified Baron Cuvier's conjecture that some of the great bones collected by Dr. Mantell belonged to the same animal as the teeth, was made by Mr. W. H. Bensted, of Maidstone, the proprietor of a stone-quarry of the Shanklin-sand formation, in the close vicinity of that town. This gentleman had his attention one day, in May 1834, called by his workmen to what they supposed to be petrified wood in some pieces of stone which they had been blasting. He perceived that what they supposed to be wood was fossil bone, and with a zeal and care which have always characterized his endeavours to secure for science any evidence of fossil remains in his quarry, he immediately resorted to the spot. He found that the bore or blast by which these remains were brought to light, had been inserted into the centre of the specimen, so that the mass of stone containing it had been shattered into many pieces, some of which were blown into the adjoining fields. All these pieces he had carefully collected, and proceeding with equal ardour and success to the removal of the matrix from the fossils, he succeeded after a month's labour in exposing them to view, and in fitting the fragments to their proper places.

This specimen is now in the British Museum.

Many other specimens of detached bones, including vertebræ or parts of the back-bone, especially that part resting on the hind limbs, and called the "pelvis," bones of the limbs down to those that supported the claws, together with jaws and teeth, which have since been successively discovered, have enabled anatomists to reconstruct the extinct Iguanodon, and have proved it to have been a herbivorous reptile, of colossal dimensions, analogous to the diminutive Iguana in the form of its teeth, but belonging to a distinct and higher order of reptiles, more akin to the crocodiles. The following were the probable dimensions of the full-grown animal:—

	ft.	in.
Total length, from the nose or muzzle to the end of the tail	34	9
Greatest girth of the trunk	20	5
Length of the head	3	6
Length of the tail	15	6

Order PTEROSAURIA.

(Wing-lizards: body supported on four feet; the outer finger of each fore-foot greatly lengthened to form the support of a membranous wing, probably connecting the fore- with the hind-feet.)

119. A portion of oolitic slate, with the metacarpal of the elongated outer digit of the *Pterodactylus Bucklandi*.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

120. A slab of oolitic slate containing a long bone, probably the first phalanx of the elongated outer digit of the *Pterodactylus Bucklandi*. The crushed and some-

what fractured shaft of the bone shows the thinness of the compact outer wall and the large size of the medullary cavity. The shaft of a wing-bone of a bird has been placed by Hunter with the specimen to illustrate its nature.
From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

121. The two tallying portions of a split slab of oolitic slate, exposing,—in one, a large portion of one of the long bones of the wing,—in the other, the impression of the same bone, of the *Pterodactylus Bucklandi.*
From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

122. A portion of oolitic slate, with a crushed portion of the shaft of one of the long bones of the wing of the *Pterodactylus Bucklandi.*
From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

123. A portion of oolitic slate, with a portion of the shaft of one of the long bones of the wing, probably the first phalanx of the outer digit, of the *Pterodactylus Bucklandi.*
From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

124. Two portions of oolitic slate, with the crushed extremities of apparently the same long bone of the wing of the *Pterodactylus Bucklandi.*
From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

125. A portion of oolitic slate, with the shaft of one of the long bones of the wing, probably the second phalanx of the outer digit, of the *Pterodactylus Bucklandi.*
From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

126. A portion of oolitic slate, with a crushed portion of the shaft of one of the long bones of the wing of the *Pterodactylus Bucklandi.*
From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

127. A portion of oolitic slate, with a portion of, apparently, the terminal attenuated phalanx of the outer digit of the *Pterodactylus Bucklandi.*
From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

128. A long bone, apparently the tibia, of the *Pterodactylus Bucklandi.* The proximal end is expanded, subcompressed, and divided by a ridge into two unequal concavities, from the smaller of which, a subcompressed, rounded process is

continued a short way upon the shaft. The distal end presents a single subtriangular convex articular surface, and a short ridge, with a convex border, is developed from the end of the shaft, terminating at the apex of the triangle. The shaft is straight and subcircular.

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

129. A portion of oolitic slate, with the shaft of the femur of a small *Pterodactylus.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

130. A portion of oolitic slate, with the shaft of a tibia of a small *Pterodactylus.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

131. Two fragments, showing the thin compact outer wall and large medullary cavity characteristic of the bones of the Pterodactyle.

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

132. A portion of oolitic slate, with a fragment of a bone of the wing of a Pterodactyle.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

133. A portion of oolitic slate, with the base of the crown of a tooth of a reptile: from its length, slenderness, cylindrical form and smooth unridged enamel, it is probably of a large Pterodactyle.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

The name 'Pterodactyle' is derived from the Greek words πτερὸν *a wing*, and δάκτυλος *a finger*: because the wings are mainly supported by the outer finger of each fore-limb, enormously lengthened and of proportionate strength, which finger nevertheless answers to the little finger of the human hand. The wings consisted of folds of skin, like the leather wings of the Bat; and the Pterodactyles were covered with scales, not with feathers: the head, though somewhat resembling in shape that of a bird, and supported on a long and slender neck, was provided with long jaws armed with teeth; and altogether the structure of these extinct members of the reptilian class is such as to rank them amongst the most extraordinary of all the creatures yet discovered in the ruins of the ancient earth.

Remains of the Pterodactyle were first discovered in 1784, by Collini, in the lithographic slate of Aichstadt, in Germany, which slate is a member of the oolitic formations: the species so discovered was at first mistaken for a bird, and afterwards supposed to be a large kind of Bat, but its true reptilian nature was satisfactorily demonstrated by Baron Cuvier, by whom it was called the *Pterodactylus longirostris*, or Long-beaked Pterodactyle: it was about the size of a curlew.

A somewhat larger species—the *Pterodactylus macronyx*, or Long-clawed Pterodactyle—was subsequently discovered by the Rev. Dr. Buckland, in the lias formation of Lyme Regis: its wings, when expanded, must have been about four feet from tip to tip. The smallest known species—the *Pterodactylus brevirostris*, or Short-beaked Pterodactyle—was discovered in the lithographic slate at Solenhofen, Germany, and has been described by Professor Soemmerring.

Remains of the largest known kinds of Pterodactyle have been discovered more recently in chalk-pits, at Burham, in Kent. The skull of one of these species—the *Pterodactylus Cuvieri*—was about twenty inches in length, and the animal was upborne on an expanse of wing of probably not less than eighteen feet from tip to tip. The long, sharp, conical teeth in the jaws of the Pterodactyles indicate them to have preyed upon other living animals: their eyes were large, as if to enable them to fly by night. From their wings projected fingers, terminated by long curved claws, and forming a powerful paw, wherewith the animal was enabled to creep and climb, or suspend itself from trees. It is probable, also, that the Pterodactyles had the power of swimming; some kinds, *e. g.* the *Pterodactylus Gemmingi*, had a long and stiff tail. "Thus," writes Dr. Buckland, "like Milton's Fiend, all-qualified for all services and all elements, the creature was a fit companion for the kindred reptiles that swarmed in the seas, or crawled on the shores of a turbulent planet.

'The Fiend,
O'er bog, or steep, through strait, rough, dense, or rare,
With head, hands, wings, or feet, pursues his way,
And swims, or sinks, or wades, or creeps, or flies.'
Paradise Lost, Book II."

Order ENALIOSAURIA.

(Sea-lizards : body naked, with four fins.)

The creatures called Enaliosauria, or Sea-lizards, from the Greek ἐνάλιος *of the sea,* and σαῦρος *lizard,* were vertebrate animals, or had back-bones, breathed the air like land quadrupeds, but were cold-blooded, or of a low temperature, like crocodiles and other reptiles. The proof that the Enaliosaurs respired atmospheric air immediately, and did not breathe water by means of gills like fishes, is afforded by the absence of the bony framework of the gill apparatus, and by the presence, position, and structure of the air-passages leading from the nostrils, and also by the bony mechanism of the capacious chest or thoracic-abdominal cavity; all of which characters have been demonstrated by their fossil skeletons. With these characters the sea-lizards combined the presence of two pairs of limbs shaped like fins, and adapted for swimming.

The Enaliosauria offer two principal modifications of their anatomical, and especially their bony, structure, of which the two kinds of these extinct animals grouped together under the respective names of *Ichthyosaurus* and *Plesiosaurus* are the examples.

Genus *Ichthyosaurus*[*].

134. An entire skeleton, with the cranium somewhat mutilated, of a young *Ichthyosaurus communis.* It is imbedded in the lias matrix with the left side exposed, and shows well the form and position of the scapulæ, the disproportion between the fore and hind paddles characteristic of the present species, the numerous digits, and the very numerous short phalangeal ossicles in the fore paddle.

This specimen is alluded to in the paper on the '*Proteosaurus*' by Sir Everard Home, Bart., in the Philosophical Transactions for 1820.

From the Lias formations of Lyme Regis, Dorsetshire. *Purchased.*

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[*] From the Greek ἰχθὺς *fish,* σαῦρος *lizard*; in reference to the combination of characters similar to those of a fish with the more essential ones of the Saurian order.

135. A section of a block of lias, containing a great part of the skull, and the beginning of the vertebral column, with part of the pelvic arch, of a young *Ichthyosaurus communis.*

This section shows the anchylosed bodies of the atlas and axis, with their hypapophyses, and that between the axis and the third vertebra. The compound structure of the lower jaw, and the implantation of the teeth of the upper jaw in the common alveolar groove, with the germs of some of the successional teeth, are well displayed. The broad notched bone at the lower angle of the slab is the coracoid. On the surface opposite the section the situation of the nostril is shown just anterior to the orbit.

From the Lias formations at Lyme Regis, Dorsetshire. *Purchased.*

136. A plaster cast of an unusually perfect skull of the *Ichthyosaurus communis.* The sclerotic plates preserved in the right orbit, and the shape, size and position of the nostrils, are well shown in this specimen.

The original is from the Lias of Leicestershire, and is preserved in the Museum of the Philosophical Society, Birmingham.

Presented by Joseph Hodgson, Esq., F.R.S.

137. A plaster cast of a portion of the skull of a large specimen of the *Ichthyosaurus communis.*

It shows the right orbit, with part of the sclerotic plates and the right nostril anterior to the orbit.

The original is from the Lias formations of Lyme Regis, Dorsetshire.

Presented by the Very Rev. W. Conybeare, F.R.S.

138. The dentigerous portions of the upper and lower jaws of a young specimen of the *Ichthyosaurus communis.*

The upper jaw includes the premaxillaries, portions of the short maxillaries and of the nasal bones, which are overlapped by the premaxillaries.

The teeth are close-set, inclined backwards in the upper and lower jaw, and forwards, but in a less degree, in the lower jaw.

From the Lias formations of Lyme Regis, Dorsetshire. *Purchased.*

139. A transverse section of a portion of both upper and lower jaws of the *Ichthyosaurus communis.*

The upper jaw is narrower than the lower jaw, and upon the cut and polished surface of this section may be seen portions of the nasal, palatine, premaxillary and superior maxillary bones. In the alveolar groove of the left side the germ of a young tooth may be observed penetrating the cavity caused by absorption on the inner side of the base of the old tooth, a mode of succession and displacement common to the extinct with the existing reptiles. In the lower jaw, the dentary, splenial and angular elements are shown, together with the wide dental canal and sections of different parts of the teeth in the alveolar grooves. The crowns of the teeth have been displayed on the left side of this specimen: those of the upper jaw incline backwards and inwards, those of the lower jaw are more erect.

From the Lias of Lyme Regis, Dorsetshire. *Purchased.*

140. A similar section of a more anterior portion of the same upper and lower jaw of the *Ichthyosaurus communis.*

The section of the tooth in the left upper alveolar groove shows well the dental characteristic of the genus; viz. the compact dentine with the thin exterior coat of enamel of the crown, the interblended osteodentine and cement of the consolidated base of the fully developed tooth, and a portion of the persistent pulp-cavity at the base of the crown: into the latter siliceous matter has infiltrated and crystallized into spar, the prisms projecting into the unfilled centre of the pulp-cavity: irregular crystals of the same spar are mingled with the petrified mud in the middle of the nasal canal; the other interspaces between the bones and teeth are filled up by the petrified lias clay. The structure of the different parts of the teeth is instructively shown by transverse sections of five of these in the right alveolar groove of the lower jaw. A young tooth with a widely open pulp-cavity is shown in the left alveolar groove of the same jaw.

From the Lias of Lyme Regis, Dorsetshire. *Purchased.*

141. A longitudinal section of the middle part of the upper and lower jaws of the *Ichthyosaurus communis.*

It shows the structure of different parts of the teeth, in some of which the pulp-cavity has been obliterated in the crown as well as at the base of the tooth.

From the Lias of Lyme Regis, Dorsetshire. *Purchased.*

142. A section of a nodule of lias, with a portion of the upper and lower jaw, with teeth, of the *Ichthyosaurus communis.*

36. A coloured plaster cast of the skull and of the ramus of a lower jaw of the *Teleosaurus Egertoni* (*Mystriosaurus* of Bronn and Kaup, see 'Abhandlungen über die Gavial-artigen Reptilien der Lias Formation,' fol. Stuttgart, 1841).

The originals are from the 'Lias Kalkstein' of Altdorf, near Nuremberg.

Presented by Professors Bronn and Kaup.

37. A coloured plaster cast of part of the bones of the trunk, tail, and limbs, also of part of the dermal skeleton, of the *Teleosaurus Egertoni* (*Mystriosaurus* of Bronn and Kaup).

The originals are from the 'Lias Kalkstein' of Altdorf, near Nuremberg.

Presented by Professors Bronn and Kaup.

The genus *Teleosaurus*, as defined by the sub-biconcave vertebræ and terminal position of the nostril, is divided by Professors Bronn and Kaup, according to the aspect of the orbit, into :—

Teleosaurus proper, with the orbits directed laterally, including the genera called *Pelagosaurus*, *Aelodon* :—and

Mystriosaurus, with the orbits directed upwards, including the genus called *Engyommasaurus*.

With respect to this character, it may be objected that in not one specimen of fossil Crocodile with a long and slender snout, nor in the recent Gavials, are the eyes or orbits directed either directly upwards or directly outwards : none have the plane of the orbits perfectly horizontal or perfectly vertical. In all the known species they look obliquely upwards and outwards ; some more upwards, some more outwards ; but not with such a marked distinction, nor with concomitant modifications of other characters, nor with the differences so constant in one group in contrast with another group, as to admit of their generic separation upon such grounds.

The *Teleosaurus Cadomensis*, e. g. No. 25, has nearly circular orbits, which look rather more upwards than outwards. The *Teleosaurus Chapmanni*, No. 27, has less circular orbits directed almost half-way between the vertical and horizontal planes. The *Teleosaurus gracilis* has full elliptic orbits directed rather more laterally than upwards.

All these species agree in the sub-biconcave vertebræ, in the terminal and oblique external nostril, in the comparatively advanced position and width of the internal nostril, in the comparatively large size and close mutual approximation of the temporal fossæ, and in the diminutive proportions of the fore-limbs as compared with the hind-limbs: all which modifications may be regarded as the natural characters of the group of ancient marine long- and narrow-snouted Crocodilians, for which it has been proposed to restrict the generic name *Teleosaurus.*

The species which Prof. Kaup has described under the name *Mystriosaurus Egertoni,* and which Prof. Bronn terms the *Mystriosaurus mit länger Symphyse,* has not the plane of the orbits horizontal; they are turned towards that aspect about as much as in the *Teleosaurus Cadomensis,* but are a full ellipse in shape, as in the *Teleosaurus gracilis.*

The frontal bone of the *Teleosaurus gracilis* differs from that of the *Teleosaurus Egertoni* by terminating in a more acute angle forwards, the point of which extends further in advance of the orbits. In the *Teleosaurus Cadomensis* this point seems not to advance beyond the anterior boundary of the orbits.

As in other *Teleosauri* the frontal is flatter above than in the Gavial, and is not made concave by the raising of the superorbital border, as in the modern long-snouted genus.

Prof. Bronn describes the frontal of his *Mystriosaurus Egertoni* as having quite the position and form of that in the existing Crocodilia*, and as agreeing in all essential respects with the Gavial†; but the elevation of the orbits above the level of the vertex is a very striking and indeed essential difference between the Gavials and the Teleosaurs: it relates to different habits and modified media of existence; perhaps also to the different periods of the earth's history assigned to their existence, and therefore to different relations of co-existence. By means of the elevated orbits the Gavial can float with its head and body submerged, yet maintaining its eyes raised above the level of the stream, cognizant of the movements of any enemy floating on the river, or prowling on its banks.

The ancient Teleosauri of the secondary ocean could have had little to dread from the land; their enemies must have been the gigantic Ichthyosauri, Plesiosauri or Cetiosauri, all denizens of the deep like themselves: the Teleosauri, therefore, did not require any special uplifting of the orbits for the better or speedier detection of their marine antagonists.

With regard to the bones of the trunk and extremities, the generic resemblance in all known species is very close. The stem of the hatchet-shaped cervical ribs is longer in proportion to its breadth in the *Teleosaurus Egertoni*, than in the *Teleosaurus Cadomensis*: the humerus is also proportionally longer and stronger in the *Teleosaurus Egertoni*: it is longer, e. g. than the bodies of three posterior dorsal vertebræ, whilst in the *Teleosaurus gracilis* it equals in length only two of the bodies of the corresponding vertebræ; but these vertebræ are relatively somewhat longer than in *Teleosaurus Egertoni*.

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* Das Stirnbein—hat ganz die Lage und Form, wie bei den lebenden Krokodiliern, p. 14.

† Alles, im Wesentlichen wie beim Gavial und Teleosaurus, ib.

The humerus of the *Teleosaurus Egertoni* is more than one-fourth the length of the upper jaw, measured from the fore-part of the orbit to the end of the snout: in the *Teleosaurus gracilis* the humerus is as much less than one-fourth of the same part of the upper jaw, as in the *Teleosaurus Egertoni* it is more.

The *radius* and *ulna* exhibit the same superiority of size in the *Teleosaurus Egertoni*, as compared with the other known species, but such differences seem to be only of specific value.

38. A slab of Stonesfield slate, in which is imbedded a dermal scute of a crocodilian reptile. The superficial circular impressions are large, and the intervening surface is irregularly reticulate: it has no ridge or crest, and is probably of a *Teleosaurus*.

From the oolitic formations of Stonesfield, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

Genus *Steneosaurus**.

39. A coloured plaster cast of the back part of the skull, including the occipital condyle, the right temporal fossa, and the right tympanic bone with the articulation for the lower jaw, of the *Steneosaurus robustus*.

The original is from the middle oolite of Oxfordshire.

Presented by Sir Henry De la Beche, F.R.S.

* This name was devised by Geoffroy St.-Hilaire, from the Greek στενὸς *narrow*, σαῦρος *lizard*, indicative of the narrow space between the temporal fossæ, which he believed to be peculiar to the fossil Crocodiles to which he assigned it: he believed also that these Crocodiles differed from the *Teleosauri* and other species with biplane or sub-biconcave vertebræ, in having the bony nasal canal prolonged to beneath the occipital condyle. Both these suppositions have been proved incorrect by later discoveries; but the name *Steneosaurus* is retained for those amphicœlian Crocodiles with the external bony nostril subterminal and oblique. (See Cuvier, Ossem. Foss., tom. v. pt. 2. pl. x. fig. 5 and 6.)

40. A coloured plaster cast of the maxillary or facial part of the skull of the *Steneosaurus robustus.* It shows the form and position of the external nostril that chiefly distinguish the cranium of this genus from that of the *Teleosaurus.* In the original the upper jaw has been obliquely fractured by partial movements of the imbedding stratum.

The original is from the middle oolite of Oxfordshire.

Presented by Sir Henry De la Beche, F.R.S.

41. A coloured plaster cast of a considerable portion of the left ramus of the lower jaw of the same *Steneosaurus.* The symphysis, as in the Gavial, is almost co-extensive with the dental series.

The original is from the middle oolite of Oxfordshire.

Presented by Sir Henry De la Beche, F.R.S.

42. A coloured plaster cast of the hinder half of the right ramus of the lower jaw of the *Steneosaurus robustus.* The articular surface is convex in the middle and concave on each side, not uniformly concave as in the modern Gavial: the depth of the ramus at the coronoid ridge is greater, and the ridge itself is higher than in the Gavial: there is no vacant space between the angular and surangular elements. The splenial piece has been detached from the original of this cast.

The original is from the middle oolite of Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

43. The centrum of a dorsal vertebra of an amphicœlian Crocodile, probably allied to the *Steneosaurus.* The neurapophyses have not been anchylosed to the centrum; the broad, rough articular surfaces for those elements meet and obliterate the neural surface at the middle of the centrum.

From an oolitic formation beneath a bed of gravel at Manstone, Dorset.

Presented by William Cunnington, Esq.

Genus *Goniopholis**.

44. The body of a cervical vertebra of the *Goniopholis carinatus.* The bases of the neurapophyses have adhered to the centrum, but traces of the sutures are manifest. The inferior surface of the centrum is divided by a longitudinal

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* From the Greek *γωνία angle, φολὶs scute*; in relation to the angular form of the bony dermal scutes in this genus of extinct Crocodile.

median ridge into two concavities. The fore-part of the centrum is flat; the hinder surface is slightly concave.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

45. The centrum with the anchylosed base of the neural arch of the *Goniopholis carinatus.*

The inferior ridge is sharper and more developed than in the preceding specimen.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

46. A similar but more mutilated specimen of a cervical vertebra of the same *Goniopholis carinatus.*

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

47. The centrum and anchylosed bone of the neural arch of a posterior cervical vertebra of the same *Goniopholis carinatus.* The parapophysis has risen to the line of the neurapophysial suture. The inferior surface of the centrum is carinate.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

48. The centrum and anchylosed base of the neural arch of a dorsal vertebra of the same *Goniopholis carinatus.* It is carinate below and more compressed than in the foregoing vertebra: the parapophysis has disappeared from the centrum.

From the oolitic formations near Cirencester.

Presented by Thomas Warner, Esq., M.R.C.S.

49. The proximal end of the right humerus of the *Goniopholis crassidens.* The pectoral ridge extends to the proximal articular surface, and is of greater breadth than in the modern Crocodile.

From the Wealden deposits near Horsham, Sussex.

Presented by G. B. Holmes, Esq.

50. The shaft of probably the same humerus of the *Goniopholis crassidens.*

From the Wealden deposits near Horsham, Sussex.

Presented by G. B. Holmes, Esq.

51. The distal end of the left femur of the *Goniopholis crassidens.*

It shows the ridge produced from behind the outer condyle. The fractured part of shaft exposes the small medullary cavity.

From the Wealden deposits near Horsham, Sussex.

Presented by G. B. Holmes, Esq.

52. The crowns of two teeth of the *Goniopholis crassidens.*

From the Wealden deposits of Sussex.

Presented by Professor Owen, F.R.S.

53. The crown of a tooth of an extinct Crocodile, nearly allied to, if not, the *Goniopholis crassidens.*

The enamelled crown is traversed by fine longitudinal and slightly wavy ridges resembling those of the *Madrimosaurus*: the cement-covered, circular base of the tooth is smooth: the pulp-cavity is widely open and filled with the oolitic matrix.

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

54. A tray of teeth of the *Goniopholis crassidens.*

From the Purbeck strata near Swanage, Dorsetshire.

Presented by Charles Wilcox, Esq., M.R.C.S.

Genus *Suchosaurus.*

55. A portion of conglomerate rock with part of the crown of a tooth of the *Suchosaurus.*

From the Wealden formations of Sussex.

Presented by Prof. Owen, F.R.S.

Genus *Hyposaurus**.

56. The centrum of a posterior cervical vertebra of the *Hyposaurus Rogersii.* The reduced parapophysis projects close to the upper surface of the centrum, midway between its articular extremities. The hypapophysis is a ridge deve-

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* From the Greek *ὑπὸ beneath, σαῦρος lizard*; in reference to the peculiar development of the inferior vertebral processes, or 'hypapophyses' in this genus of extinct Crocodile.

loped from nearly the whole of the under surface of the centrum. The neurapophysial surfaces approximate to within two lines of each other above the middle of the centrum.

From the green-sand formations of New Jersey, United States.

Presented by Prof. H. Rogers.

57. A coloured plaster cast of an anterior dorsal vertebra of the *Hyposaurus Rogersii.*

The parapophyses have almost merged in the neurapophysial surfaces. A greater proportion of the carinate hypapophysis is here preserved.

The original is from the green-sand formations of New Jersey, United States. *Presented by Prof. H. Rogers.*

Genus *Cœlosaurus*[*].

58. A mutilated centrum of a dorsal vertebra of the *Cœlosaurus.*

The neurapophyses have coalesced with the centrum, but the arch is broken off: the contour of the articular ends of the centrum is subcircular, and they are both regularly and pretty deeply concave. The free surface of the centrum is longitudinally concave between the articular ends. The bone presents a compact cellular structure, and is completely petrified.

It has been probably washed out of an upper oolitic stratum, and is from the Drift of West Norfolk.

Presented by C. B. Rose, Esq., F.R.C.S.

Genus *Poikilopleuron*[†].

59. One-half of the centrum of a dorsal vertebra of the *Poikilopleuron Bucklandii.*

The articular extremity here preserved is elliptical with the long diameter vertical, and is slightly concave: the middle of the centrum is contracted: the fractured surface exposes a medullary cavity surrounded by large cancellous vacuities, which have become filled with siliceous spar and pyritic matter:

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[*] From the Greek κοῖλος *hollow,* σαῦρος *lizard*; in reference to the unusual depth of the subconcave articular surfaces of the vertebræ in this Crocodilian genus.

[†] A name devised by M. Eudes-Deslongchamps, from the Greek ποικίλος *varied,* πλευρὸν *rib,* to signify that the ribs vary in structure in the skeleton of this reptile.

there is a small depression on each side near the base of the neural arch which seems to lead, like a pneumatic foramen, into the cavities of the bone. The thin outer wall of this unusual structure consists of very compact osseous matter.

From the submerged Wealden beds at Brook Point, Isle of Wight.

Presented by Prof. Owen, F.R.S.

60. A mutilated vertebra of the *Poikilopleuron Bucklandii*.

The articular extremities of the centrum have been subject to abrasion, but the oblique surface at the lower part of the posterior one appears to indicate an articulation for a hæmal arch, characteristic of a caudal vertebra.

From the submerged Wealden beds off Brook Point, Isle of Wight.

Presented by Alexander Duff, Esq.

c. With prospherian vertebræ; or those that have the anterior articular surface of the body convex, the posterior one concave.

Genus *Streptospondylus**.

61. A vertically bisected cervical or anterior dorsal vertebra of the *Streptospondylus Meyeri*.

The anterior articular end of the centrum is convex, the posterior one concave. The parapophysis projects immediately behind the anterior ball, and presents a slight concavity for the head of the rib. Above it is a deep, oblique depression entering the side of the centrum. The diapophysis extends from near the fore-part of the base of the neural arch obliquely downwards and backwards, and is strengthened by an oblique ridge abutting against its posterior surface, and dividing two deep depressions in the side of the neurapophysis. The texture of this vertebra offers the same medullary cavity in the centrum and surrounding open cancellous structure, with thin compact walls, as in the vertebræ are obliquely divided, owing to their partially dislocated state, before the petrifaction of the surrounding matrix.

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* From the Greek *στρέφω I turn, σπόνδυλος vertebra*; in allusion to the reversed position of the cup and ball surfaces of the cervical and anterior dorsal vertebræ, as compared with existing Crocodiles. The Saurian with this modification of the vertebral column was first made known by Cuvier, in the 'Bulletin de la Société Philomathique,' 1801, p. 159; and in the 'Annales du Muséum,' tom. xii. p. 83, under the name of the '1re Gavial de Honfleur.'

From the Lias of Lyme Regis, Dorsetshire. *Purchased.*

189. The bodies of four vertebræ of an *Ichthyosaurus*, resembling that of the *Ich. communis*, from the corresponding part of the trunk.

These are described in the original Hunterian Catalogue as "four large vertebræ, part of a series of 15, which was found lying in a row in Shotover in Oxfordshire, and were all formerly in the collection of Mr. Andrew Peter Dupont."

From the oolitic clay of Oxfordshire. *Hunterian.*

190. The centrum of a vertebra of the same species of *Ichthyosaurus*.

It is from the anterior part of the trunk, where the ribs articulate to both diapophysis and parapophysis.

From the oolitic clay of Shotover, Oxfordshire. *Hunterian.*

191. A centrum of a vertebra from the fore-part of the trunk of the same species of *Ichthyosaurus*. The neurapophysial pits are long, narrow and deep.

From the oolitic clay of Shotover, Oxfordshire. *Hunterian.*

192. The centrum of a vertebra from the anterior part of the trunk of the same species of *Ichthyosaurus*.

From the oolitic clay of Shotover, Oxfordshire. *Hunterian.*

193. The centrums of two vertebræ of apparently the same species of *Ichthyosaurus*; they are from the hinder part of the trunk, where the ribs are supported on a single process.

From the oolitic clay of Shotover, Oxfordshire. *Hunterian.*

194. The bodies of two vertebræ, and a portion of a third, of the same species of *Ichthyosaurus*.

From the oolitic clay of Shotover, Oxfordshire. *Hunterian.*

195. The body of a vertebra of an *Ichthyosaurus*, with a portion of rib cemented thereto by the liassic matrix.

Locality unnoted. *Hunterian.*

196. The bodies of two apparently consecutive vertebræ of the trunk of an *Ichthyosaurus.*

From an oolitic formation in "Oxfordshire." *Hunterian.*

197. The body of a vertebra from the trunk of an *Ichthyosaurus.* The two tubercles for the double articulation of the rib are present on both sides, near the lower part of the vertebra.

From an oolitic formation in "Oxfordshire." *Hunterian.*

198. The body of a vertebra from the trunk of an *Ichthyosaurus.*

From an oolitic formation in "Oxfordshire." *Hunterian.*

199. A mass of blue limestone, with ten more or less mutilated vertebræ and a few ribs of a small *Ichthyosaurus.* The specimen is referred in the Hunterian MS. Catalogue to a fish, probably on account of the biconcave vertebræ.

From the oolitic formations at Walcot, near Bath. *Hunterian.*

200. A mass of oolitic stone enclosing five vertebræ of an *Ichthyosaurus.* This specimen is described in the Hunterian MS. Catalogue as "*l.* x 7. Part of a back-bone with five vertebræ and a cast of the cartilage at one end, and with the ribs issuing from them, thick, strong, and bony, of a very large fish." The cast referred to is of the biconcave intervertebral space; the two transverse processes on each side of the centrum and the bifurcate end of the rib for articulating therewith both exemplify the distinction between the present extinct air-breathing marine animal and the true fish.

From an oolitic matrix; locality unnoted. *Hunterian.*

201. A portion of lias clay showing the cast of the articular concavity at one end of the body of a vertebra of an *Ichthyosaurus.*

Locality unnoted. *Hunterian.*

202. Five vertebral bodies from the tail of an *Ichthyosaurus.*

They are entered in the Hunterian MS. Catalogue as "*l.* x 11, small flattish vertebræ of a fish."

Locality unnoted. *Hunterian.*

The specimens, 189 to 202 inclusive, are those referred to in the following passage of the Memoir by Sir Everard Home, "On the Proteosaurus" (*Ichthyosaurus* of König), Philosophical Transactions, 1820:—

> "The structure of the vertebræ of the *Proteosaurus* is something intermediate between the two kinds which I have described. It is composed of bone, as in the Lizard tribe, but consists of a body only, behind which is a canal for the spinal marrow, and the spinous process with two lateral branches which belong to it, quite distinct from the body of the vertebra, and between these there is no bony union, but a species of joint peculiar to themselves; the canal thus formed, defends the spinal marrow from injury, equally as when the whole vertebra is in one piece; it is unusually small. The bodies of these vertebræ, when met with without the spinous processes, have so close a resemblance to the vertebræ of the Shark in a fossil state, that they have, till now, been mistaken for them; and I found several of them preserved in the Hunterian Collection, marked as belonging to that fish."

203. A section of a block of lias, taken through a series of six dorsal vertebræ therein imbedded, of an *Ichthyosaurus*.

The section displays the neural canal and parts of the neural arches and spines of the vertebræ. The original contents of the canal have been displaced by silex, which at one part assumes the character of white spar, and is called 'fossil marrow' by the quarrymen. The coarse cancellous structure of the bone is well displayed in this section. Remains of small ammonites, which co-existed with the extinct reptile, and of modern barnacles that have attached themselves to the petrified clay after its re-submersion, are attached to this specimen.

From the Lias of Lyme Regis, Dorsetshire. *Purchased.*

204. A block of oolitic sandstone, containing two vertebræ and a humerus of an *Ichthyosaurus*.

Locality unnoted. *Hunterian.*

205. A block of lias, including some vertebræ and part of the scapular arch of an *Ichthyosaurus*. The natural relative position of the scapula and coracoid with each other, and with the clavicle and episternum, is well displayed in this fragment. The scapula is slightly bent: the anterior prominence of its lower expansion abuts against the middle of the clavicle: the posterior thicker and

shorter portion of its rough articular surface aids in forming the glenoid cavity for the humerus: the larger proportion of this cavity is formed by the coracoid. The surface is rough and coarsely pitted, indicating the ligamentous character of the shoulder-joint.

The clavicles are strong, elongated, slightly curved bones, thicker in the middle than at their extremities, articulated by an oblique suture to the transverse process of the episternum with their median extremities in contact, but not anchylosed together as in the furculum of the bird: in this respect, as in their connexion with the episternal bone, they correspond with the clavicles of the *Ornithorhynchus*. In the entire mechanism of the complex pectoral arch, the resemblance between these otherwise very different animals is remarkably close, whilst the difference which both these air-breathing aquatic animals present in this part of their osseous structure from the Cetacea is very striking. In the Cetacea there is not any osseous bar interposed between the two shoulder-joints, or the centres on which the fore-paddles worked; while similar movements of the fore-paddles of the *Ichthyosaurus* had, as in the *Ornithorhynchus* they still have, their momentum transferred to, and resisted by, not less than three transverse bones, viz. first by the clavicles; second, by the episternal forks and the scapulæ; and third, by the coracoids and scapulæ. In entering into the consideration of the difference in the habits of these species, to which these differences of structure may have had reference, it may be first remarked that they could not relate exclusively to the necessity of rising to the surface of the water to respire air; for this necessity exists in all the three types of aquatic animals, and much more imperatively in the warm-blooded Cetacea than it could have done in the Enaliosauria. In the *Ornithorhynchus* the anterior extremities are directed outwards, as in marine Cetacea and Enaliosauria; but they are destined in the monotrematous quadruped to be applied not only to displace water, but occasionally a much more resisting medium, as in the act of burrowing, and not unfrequently they are used in progression on the dry land: in order, therefore, to enable the fore-limbs to react with due force on the body, a strong apparatus of bone is introduced between the two shoulder-joints, whereby these parts are prevented from yielding inwards and compressing the soft muscular masses. But in the Cetacea, which were never intended to quit the deep, such an apparatus of bone, as it would have added unnecessarily to their weight, has been excluded from the mechanism of their anterior extremities; and hence it is that, when they have the misfortune to be stranded, they are unable to regain their native element. The instrument for bringing the head to the surface of the water for the purpose of breathing is the same in both the Monotreme and the Cetacean, viz. a strong, muscular, horizontally flattened tail. In the *Ichthyosaurus* a pair of hinder paddles (which in the large-headed species, as in *Ich. platyodon*, are equal in size with the fore-paddles) must have fully compensated for that different structure of the tail, which, while it rendered it less efficient as a means of raising the head to the surface, made it a more perfect instrument in ordinary natation; and the sufficiency of this compensation will be better appreciated, when it is remembered that the Reptilian structure of the lungs and heart of the *Ichthyosaurus* would allow it to dispense with so perfect a machinery for rising to the surface as was essential to the warm-blooded aquatic Mammalia above cited.

In reference, then, to the question—For what purpose were the sterno-clavicular and coracoid arches assigned to the *Ichthyosaurus*? it may be replied, in order that the anterior paddles might be subservient to locomotion, not only in the water, but on land; and that, when applied to the resisting soil, they might react with due force on the trunk. It is very conceivable that the *Ichthyosaurus*, like the Crocodile, may have come ashore to sleep: it is most probable that they resorted to the shore to deposit their eggs, supposing them to have been oviparous, as the sum of their analogies deducible from their osseous texture would indicate. The hind paddles would also be serviceable in terrestrial progression, as in the *Ornithorhynchus*, while in the strictly marine *Cetacea* they could readily be dispensed with.

From the liassic deposits near Bristol. *Purchased.*

206. A block of lias, in which are imbedded the scapula, coracoid, and apparently a portion of the humerus, of an *Ichthyosaurus*.

From Lyme Regis, Dorsetshire. *Purchased.*

207. The termination of the humerus, with three of the carpal bones, of a large *Ichthyosaurus*.

They are cemented together by the petrified liassic clay.

Locality unnoted. *Hunterian.*

208. A small portion of lias rock, in which is imbedded a fragment of the vomer, and one of the nasal bones of an *Ichthyosaurus*.

From the Lias of Saxony. *Hunterian.*

209. A portion of oolitic stone, in which is imbedded a fragment of the lower jaw of an *Ichthyosaurus*.

Locality unnoted. *Hunterian.*

210. A Coprolite, or mass of petrified fæcal matter of an *Ichthyosaurus*. The surface shows the impression of what seems to have been a slightly produced, narrow, spiral fold of the intestinal mucous membrane, and also more minute impressions, like the vessels on that part.

From the Lias of Lyme Regis, Dorsetshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

211. A portion of a large Coprolite, including masticated and undigested fragments of the bones and scales of ganoid fishes, and with the impression of the internal, spiral valve or fold of the intestine of an *Ichthyosaurus*.

From the Lias of Lyme Regis, Dorsetshire.

Presented by James Luke, Esq.

Genus *Pliosaurus**.

212. A somewhat crushed centrum of a posterior cervical vertebra of the *Pliosaurus trochanterius*.

The base of the left neurapophysis has remained attached to the sutural surface of the centrum, and shows that it contributed a small part of the costal surface; the rest of this surface is supported by a slightly prominent parapophysis, which has ascended in this vertebra to the neurapophysial surface. If the force which has distorted this vertebra had been applied to it in its recent state it must have fractured it, and the pieces would have been separated before fossilization took place. Its present condition is plainly owing to some movement of the stratum in which it was imbedded, and which by uniformly supporting the surface during the compressing action, has retained the crushed parts of the petrified vertebra in their natural juxtaposition. It has, afterwards, been washed out of its bed and exposed sufficiently long in the sea to allow of the attachment of the shells and tribes of Marine Invertebrata to parts of its surface.

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* The Pliosaurus was a large marine reptile with four fin-shaped limbs, longer and stronger than in the Ichthyosaurus; with a longer neck, supporting a head constructed more nearly after the type of the Crocodile. Its name indicates that it was more closely allied to the Saurian Order than the Plesiosaurus, and is from the Greek *πλείων more, σαῦρος lizard.*

From the Kimmeridge clay of the upper oolite of Oxfordshire.

Presented by Prof. Owen, F.R.S.

213. The centrum and bases of the partially anchylosed neurapophyses of a dorsal vertebra of the *Pliosaurus trochanterius.* The articular ends of the centrum are subconcave; they measure six inches three lines in vertical, and five inches ten lines in transverse diameter: the antero-posterior diameter of the centrum is three inches. The neural canal does not exceed an inch in diameter at its middle part: the diapophyses are subcompressed, of great strength, presenting a subconvex surface for the rib of four inches in the long diameter.

From the Kimmeridge clay, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

214. A dorsal vertebra of a young *Pliosaurus.* The neural arch has not become anchylosed with the centrum, but the neurapophyses have coalesced with each other.

From the Kimmeridge clay of Oxfordshire.

Presented by Professor Phillips, F.R.S.

215. A plaster cast of a cervical vertebra of a *Pliosaurus.*

The original is from a Russian formation, apparently equivalent to the Oxford clay in geological age.

Presented by Sir Roderick Impey Murchison, F.R.S.

216. The lower end, with the articular surface of the left tympanic bone, of a *Pliosaurus.*

The contour of the articular surface is like the figure 8, consisting of a larger and smaller convexity divided by a shallow groove, which is continued upwards upon both the anterior and posterior surfaces of the bone. The articular surface, when entire, is smooth and impressed by the deep circular pits from one to two lines in diameter, which usually characterize the same surface in other bones of the *Pliosaurus.* The long diameter of the articular surface is seven inches; the bone is about four times the size of the corresponding one in the largest heads of the Crocodiles in the Museum.

From the Kimmeridge or Oxford clay; locality unnoted.

Mus. Parkinson.

217. The proximal end of the humerus of the *Pliosaurus trochanterius.*

It is described in the Hunterian MS. Catalogue as "the head of a very large os humeri, quite petrified, probably of a crocodile." The specimen has been split lengthwise, and shows the absence of any medullary cavity as far as the shaft extends.

Portions of adherent matrix resemble most the Kimmeridge clay of the oolitic series of formations.

Locality unnoted. *Hunterian.*

218. A somewhat mutilated distal extremity of the femur of a *Pliosaurus.* The fractured end shows the coarse cancellous structure occupying the centre of the shaft of the bone.

From the Kimmeridge clay, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

219. A coloured plaster cast of a femur of the *Pliosaurus trochanterius.*

It is two feet in length, ten inches broad at the distal end, and twelve inches round the smallest part of the shaft; and indicates an individual not less than thirty feet in length. The head of the bone is rough and coarsely pitted, indicating the ligamentous character of the joint, and the great trochanter is unusually distinct and well developed.

The original is from the Kimmeridge clay, Shotover Hill, Oxfordshire.

Presented by the Earl of Enniskillen, F.R.S.

220. The crown of a young tooth, wanting the apex, of a *Pliosaurus.*

The teeth of this genus differ from those of the *Plesiosaurus* in their greater relative thickness as compared with their length, and in the subtrihedral shape of their crown; the outer side is slightly convex, sometimes nearly flat; it is separated from the two other sides by two sharp ridges; these are more convex, and the angle between them is often so rounded off that they form a demi-cone, and the shape of the tooth thus approximates very closely to that of the Mosasaurus, with which it is equal in size. It may be readily distinguished, however, even when the crown only is preserved, by the ridges which traverse the inner or convex sides, the outer flattened surface alone being smooth. In the present specimen the base of the crown is widely excavated, the formation of the fang not having commenced.

From the Kimmeridge clay of Shotover, Oxfordshire.

Presented by the Earl of Enniskillen, F.R.S.

221. The crown of a tooth, somewhat crushed, of a *Pliosaurus*. It shows well the strong longitudinal ridges of the enamel covering the convex inner side which distinguish it from the similarly shaped tooth of the *Mosasaurus*.

From the Kimmeridge clay of Market Rasen, Yorkshire.

Presented by Prof. Owen, F.R.S.

Genus *Plesiosaurus*.

The restoration of the extinct Reptiles which form the type of this genus is perhaps one of the most important results of the application of Comparative Anatomy to the problematic remains submitted to its cultivators by geologists. Baron Cuvier deemed the structure of the Plesiosaurus to have been the most singular, and its characters the most monstrous, that had been discovered amid the ruins of a former world. To the head of a Lizard it united the teeth of a Crocodile, a neck of enormous length, resembling the body of a Serpent, a trunk and tail having the proportions of an ordinary quadruped, the ribs of a Chameleon, and the paddles of a Whale. "Such," writes Dr. Buckland, "are the strange combinations of form and structure in the Plesiosaurus, a genus, the remains of which, after interment for thousands of years amidst the wreck of millions of extinct inhabitants of the ancient earth, are at length recalled to light by the researches of the geologist, and submitted to our examination in nearly as perfect a state as the bones of species that are now existing upon the earth."—*Bridgewater Treatise*, vol. i. p. 203.

The first remains of this animal were discovered in the lias of Lyme Regis, about the year 1823, and formed the subject of the paper by the Rev. Mr. Conybeare (now Dean of Llandaff), and Mr. (now Sir Henry) De la Beche, in which the genus was established and named *Plesiosaurus*, from the Greek words πλησίος and σαῦρος, signifying "near," or "allied to," and "lizard," because the authors saw that it was more nearly allied to the Lizard than was the *Ichthyosaurus* from the same formation.

The entire and undisturbed skeletons of several individuals, of different species, have since been disinterred, fully confirming the sagacious restorations by the original discoverers of the *Plesiosaurus*. Of these species the one exemplified in the following specimen is, perhaps, the most instructive and perfect.

222. A coloured plaster cast of a slab of lias, in which is imbedded the skeleton of a Plesiosaur (*Plesiosaurus Hawkinsii*).

It lies upon its back in the matrix: part of the left paddle is wanting, and the tail is slightly displaced; the rest of the skeleton has preserved the natural juxtaposition of its parts. The coracoid and scapulæ, the ischia and pubes, and the strong abdominal ribs are well displayed. The head is smaller than in the *Plesiosaurus macrocephalus*, and larger than in the *Pl. dolichodeirus*. The neck equals three lengths of the head, and the neck and head together equal the trunk and tail. The number of vertebræ throughout the spinal column is between 90 and 100. In the cervical region there are 31 vertebræ characterized by the costal surface on the sides of the centrum: from the 32nd to the 56th vertebra inclusive, the costal articular surface is wholly impressed upon the neurapophysis: from the 55th vertebra this surface begins again to descend upon the side of the centrum, and it has entirely left the neurapophysis at the 61st vertebra. At the 80th vertebra the costal surfaces disappear. The number of caudal vertebræ extending beyond the ischium is 35.

The original is from the Lias of Street, Somersetshire.

Presented by Thomas Hawkins, Esq., F.G.S.

223. A crushed cervical vertebra of a *Plesiosaurus*, apparently the *Pl. dolichodeirus*.

The vertebra is longer than it is broad: the costal surfaces are small, and situated near the under surface of the centrum: the neurapophyses have coalesced with the centrum, and the neural canal has been obliterated by the pressure which has fractured their bases. The anterior and one of the posterior zygapophyses have been preserved, together with a part of the thin antero-posteriorly expanded neural spine.

From the Lias of Lyme Regis, Dorsetshire.

Presented by the Very Rev. W. Conybeare, F.R.S.

224. The centrum of a caudal vertebra of the same *Plesiosaurus*.

From the Lias near Axminster, Dorsetshire.

Presented by the Very Rev. W. Conybeare, F.R.S.

225. A dorsal vertebra of the *Plesiosaurus dolichodeirus*.

The neural arch has coalesced with the centrum, but its processes have been more or less mutilated. This is described in the Hunterian MS. Catalogue as "a vertebra of some quadruped, found in Mr. Anthony Merry's house, in Queen's Square, Westminster."

From its state of petrifaction it has been obtained from some oolitic formation. *Hunterian.*

226. The centrum of a cervical vertebra of the *Plesiosaurus platydeirus.*

It is nearly as long as it is broad, but is subdepressed, or somewhat flattened from above downwards; the form of the articular ends being a full ellipse, with the long axis transverse: their surface is flat. The costal surface is small, divided by a longitudinal groove, and distant nearly its own vertical breadth from the neurapophysial surface. The under surface of the centrum is nearly flat, and shows the two usual vascular foramina.

This vertebra has been exposed on a sea-beach, and a modern Serpula has cemented its tube to one end: it has probably been washed out of a lias cliff on some part of the coast of England, but the locality is unnoted.

Hunterian.

227. The centrum and anchylosed bases of the neurapophyses of a caudal vertebra of a *Plesiosaurus,* probably *Ples. platydeirus.*

The form of the articular ends of the vertebra resembles that in the preceding specimen, but they are more concave, as is usual in the caudal region: the under surface of the centrum shows the hæmapophysial surfaces, the hinder pair being the largest: the articular surfaces for the caudal ribs are large, simple, and slightly prominent.

From the Lias of Lyme Regis, Dorsetshire.

Presented by the Earl of Enniskillen, F.R.S.

228. The centrum of a cervical vertebra of the *Plesiosaurus truncatus.*

The neurapophysial surfaces are triangular and deep. The upper orifices of the venous canals are seen at the middle of the neural tract, and their lower orifices about an inch apart at the under surface of the vertebra.

From the Kimmeridge clay at Shotover, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

229. A body of a cervical vertebra of the *Plesiosaurus truncatus.*

From the Kimmeridge clay, Shotover, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

230. The somewhat mutilated centrum of a cervical vertebra of a *Plesiosaurus,* having the general form and proportions of those of the *Pl. truncatus.*

Locality unnoted. *Hunterian.*

231. Three cervical vertebræ of the *Plesiosaurus depressicostatus,* wanting the neural arch.

The bases of the neurapophyses remain attached to two of the vertebræ; the pleurapophyses appear also to have been anchylosed; the fractured base projects from the lower part of the side of the centrum, of a narrow antero-posteriorly extended figure, on a level with the under surface, which is slightly convex transversely, and perforated by the two venous canals.

Locality unnoted. *Hunterian.*

232. A mutilated dorsal vertebra with part of a contiguous centrum of the same *Plesiosaurus depressicostatus.*

Locality unnoted. *Hunterian.*

233. Four cervical vertebræ in natural sequence, slightly dislocated, and united by petrified lias clay, of the *Plesiosaurus megapleuron.*

The costal surfaces are large and deep, situated near the under surface and hinder border of the centrum. The neurapophyses are anchylosed to the centrum. The anterior zygapophyses have their articular surface directed upwards and inwards, and are slightly concave; the posterior ones, with an opposite aspect, are slightly convex. The neural spines are broken off. There is a central prominence in the shallow terminal articular cavities of the centrum: the under surface is slightly concave lengthwise: the two large vascular perforations are separated by a slightly convex median longitudinal bar, which increases in breadth as the vertebræ extend backwards.

Locality unnoted. *Mus. Parkinson.*

234. An anterior cervical vertebra of the *Plesiosaurus leptopleuron.* The neural arch has been broken away, but the bases of the pleurapophyses have coalesced with the centrum. The neural canal has been filled with oolitic sandstone.

Locality unnoted. *Hunterian.*

235. A cervical vertebra from near the base of the neck of the *Plesiosaurus leptopleuron.* The neural arch has coalesced with the centrum, but its processes have been broken away.

Locality unnoted. *Hunterian.*

236. A cervical vertebra from the base of the neck of the *Plesiosaurus subconcavus*.

The articular ends of the centrum are concave; the zygapophyses and neural spine have been broken away.

From the Lias of Somersetshire. *Presented by Samuel Stutchbury, Esq.*

237. A dorsal vertebra of the *Plesiosaurus subconcavus*. The neural spine is broken away, and the specimen has been much water-worn on one side.

From the Lias of Somersetshire. *Presented by Samuel Stutchbury, Esq.*

238. A dorsal vertebra of the *Plesiosaurus compressus*. The neural spine has been broken away. The vascular canals open upon the sides of the centrum.

From the Lias of Somersetshire.

Presented by Channing Pearce, Esq., F.G.S.

239. An anterior cervical vertebra, wanting the summit of the neural arch, of the *Plesiosaurus subplanus*.

The neurapophyses are anchylosed to the centrum, but the line of suture may be traced. The costal surfaces are on a level with the lower flattened surface of the centrum, which is perforated by two vascular canals. The terminal articular surfaces are very slightly concave with a transverse groove in the middle.

From the oolitic clay of Oxfordshire.

Presented by Hugh Strickland, Esq., F.G.S.

240. The centrum of a cervical vertebra from near the base of the neck of the same *Plesiosaurus subplanus*.

The base of the left neurapophyses remains attached, but the articular surface for the other shows that the anchylosis has not been completed: the centrum has increased in breadth and depth in a greater degree than in length.

From the oolitic clay of Oxfordshire.

Presented by Hugh Strickland, Esq., F.G.S.

241. The centrum of the last cervical vertebra of apparently the same *Plesiosaurus subplanus*.

The costal surface has almost entirely passed from the centrum upon the base of the neurapophyses. In this vertebra, with an increase of breadth and depth, there is none in length.

From the oolitic clay of Oxfordshire.

Presented by Hugh Strickland, Esq., F.G.S.

242. The centrum of a cervical vertebra of the *Plesiosaurus pectopleuron.*

Both the neurapophyses and pleurapophyses have coalesced with the centrum, but both parts have been broken away.

From the oolitic limestone of Foxcomb Hill, Oxfordshire.

Presented by John Brown, Esq., F.G.S.

243. The centrum of the cervical vertebra of the *Plesiosaurus pectopleuron,* with the bases of the fractured and anchylosed neurapophyses and pleurapophyses.

From the oolitic limestone of Foxcomb Hill, Oxfordshire.

Presented by John Brown, Esq., F.G.S.

244. The centrum of a caudal vertebra of the *Plesiosaurus pectopleuron.* The anchylosed bases of the neurapophyses and the bases of the diapophyses are attached to the centrum: the characteristic of the caudal region is shown by the hypapophysial surfaces near the hinder margin of the centrum.

From the oolitic limestone of Foxcomb Hill, Oxfordshire.

Presented by John Brown, Esq., F.G.S.

245. The dorsal vertebra of the *Plesiosaurus levis.* The neural arch has not coalesced with the centrum.

From the Kimmeridge clay, Shotover Hill, Oxfordshire.

Presented by John Brown, Esq., F.G.S.

246. The centrum of a dorsal vertebra of the *Plesiosaurus levis.*

From the Kimmeridge clay, Shotover Hill, Oxfordshire.

Presented by John Brown, Esq., F.G.S.

247. The centrum of a dorsal vertebra of a *Plesiosaurus,* having the general proportions and flattened articular ends of those of the *Pl. levis,* but with the sides rather more compressed, and the under surface narrower and more prominent.

Locality unnoted. *Hunterian.*

248. The centrum of a cervical vertebra of the *Plesiosaurus subdepressus.*

From the Kimmeridge clay, Nuneham, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

249. The centrum of a vertebra from the base of the neck of the *Plesiosaurus brevis.* It is twice as broad as long, and slightly concave at both ends: the costal surfaces are continuous with those for the neural arch.

From the Oxford clay of Wiltshire.

Presented by William Cunnington Esq.

250. The body of an anterior dorsal vertebra of the *Plesiosaurus costatus.*

From the Lias of Lyme Regis, Dorsetshire.

Presented by the Very Rev. W. Conybeare, F.R.S.

251. A plaster cast of two cervical vertebræ of the *Plesiosaurus latispinus.*

One of these is from the middle of the neck, with the neural spine entire, showing a length of five inches and an antero-posterior diameter of two inches and a half. The costal surface is rather prominent, concave, single, on a level with the inferior, almost flat surface of the vertebra, and situated in the anterior half of the centrum. The articular extremity is a transverse ellipse. The second vertebra is from the base of the neck, and exhibits a greater proportional breadth.

The original is from the Green-sand formation, near Maidstone, Kent.

Presented by William Harding Bensted, Esq.

252. A cervical vertebra, wanting the summit of the neural arch, of the *Plesiosaurus dibothrius.*

The ends of the centrum are more concave than in the typical *Plesiosauri*: the neurapophyses retain their sutural articulations with the centrum: the surfaces for the ribs are near the under surface of the centrum; one rib has become anchylosed, and has been broken. A median ridge divides two concavities on the under surface, in which are situated the venous foramina. The centrum is short in proportion to its breadth and height.

From the Triassic bone-bed at Aust Passage, near Bristol.

Presented by S. Stutchbury, Esq., F.L.S.

253. A section of six of the dorsal vertebræ of a large *Plesiosaurus,* exposing the neural canal, which is partly occupied by siliceous spar.

From the Lias of Dorsetshire. *Purchased.*

254. A section of a block or nodule of lias having imbedded six vertebræ of a large *Plesiosaurus* and several small specimens of Ammonite. The section shows the osseous structure of the vertebral bodies, and the small extent of the intervertebral cavities arising from the almost flattened articular surfaces, which forms the chief distinction between the vertebræ of the *Plesiosaurus* and *Ichthyosaurus*.

From the Lias of Dorsetshire. *Purchased.*

255. A plaster cast of the anchylosed atlas and axis of a *Plesiosaurus*. The hypapophysis is confluent with the lower part of the atlas: the neural arch has been broken away. Parapophyses with articular surfaces for ribs are developed from the sides of the axis vertebra.

The original is from an oolitic formation in Cambridgeshire.

Presented by the Rev. Prof. Sedgwick, F.R.S.

256. A mutilated centrum of a dorsal vertebra of a *Plesiosaurus*.

It is of greater breadth than length; but is chiefly remarkable for the degree of concavity of the articular ends: the neurapophyses have coalesced with the centrum: the non-articular surface is smooth, and is pretty equally concave lengthwise.

From the oolitic formations at Stradsett. *Hunterian.*

257. A mutilated centrum with the coalesced bases of the neurapophyses of a vertebra from near the base of the neck of a *Plesiosaurus*.

Locality unnoted. *Hunterian.*

258. A dorsal vertebra, wanting the neural spine and zygapophyses of a *Plesiosaurus*. The long diapophysis has a ridge at its fore-part.

From the Upper Lias shale near Whitby, Yorkshire.

Presented by Thomas Ripley, Esq.

259. Five dorsal vertebræ, with fragments of ribs, of a *Plesiosaurus*. The antero-posterior diameter of the centrum is short in proportion to its breadth; the articular ends are more concave than usual.

Locality unnoted: the adherent matrix shows the specimen to have been from a lias formation. *Mus. Parkinson.*

260. Ten vertebræ, including those at the end of the trunk and beginning of the tail, with portions of the pelvis, the right femur, and some bones of the hind fin, of a *Plesiosaurus.* This specimen demonstrates the absence of a sacrum in this extinct marine reptile: all the bones are partially imbedded in a block of lias.

From Barrow-on-Soar, Leicestershire. *Presented by Prof. Owen, F.R.S.*

261. A block of oolitic stone in which is imbedded a rib, resembling in its shape, curvature and single articular surface, one of the thoracic ribs of a *Plesiosaurus.*

From Stonesfield, Oxfordshire. *Hunterian.*

262. A centrum, with the coalesced bases of the neural arch, of a caudal vertebra of a *Plesiosaurus.* The anterior border of the under surface presents a pair of triangular surfaces for the hæmapophyses: the pleurapophyses have coalesced with the centrum: the articular extremities are slightly concave.

Locality unnoted. *Hunterian.*

263. The bodies of two anterior caudal vertebræ of a *Plesiosaurus.* The costal surfaces are developed from the sides of the centrum, and are continuous with the neurapophysial surfaces: the under surface of the centrum is broad and flat: the hypapophysial surfaces are largest at its back part.

Locality unnoted. *Hunterian.*

264. A caudal vertebra, with the crown of the neural arch broken away, of a *Plesiosaurus.* The base of the left pleurapophysis remains partially anchylosed to both the side of the centrum and the neurapophysis: the cavity to which the right pleurapophysis was articulated is shown. The articular ends of the centrum, especially the hinder one, are more concave than in the vertebræ of the trunk. The posterior surfaces for the hæmapophyses are most developed.

Locality unnoted. *Hunterian.*

265. A somewhat crushed specimen of the right humerus of the *Plesiosaurus dolichodeirus.* The rough, tuberculate, proximal and distal surfaces indicate that it was articulated by ligamentous matter, not by a cartilaginous surface and a synovial joint.

From the Lias near Axminster.

Presented by the Very Rev. W. Conybeare, F.R.S.

266. The head of a humerus or femur, and part of the compressed distal end of the same bone, of a Plesiosauroid reptile. They are described in the Hunterian MS. Catalogue, as "two fragments of large bones coarsely petrified with sandy ferreous matter, and one has a crust of selenites; they are therefore probably from Shotover, Oxfordshire."

The same selenitic crust may be observed in the corresponding surface of the other fragment; and, on the opposite side, the bony substance has been crushed and broken in, of both specimens. *Hunterian.*

267. A block of lias clay containing the petrified radius and portions of ribs of a *Plesiosaurus.* From the attached specimens of recent Balanus, it has been exposed for some time on the sea-shore.

The specimen is inscribed "from Holland:" the mineralized condition of the specimen resembles that of the Plesiosaurian fossils from the oolite. *Hunterian.*

268. The ulna of a *Plesiosaurus,* imbedded in a mass of oolitic sandstone.

Locality unnoted. *Hunterian.*

269. A carpal or tarsal bone of a large Plesiosauroid reptile.

From the Kimmeridge clay of Cambridgeshire.

Presented by the Rev. Prof. Sedgwick, F.R.S.

270. A carpal or tarsal bone of a large Plesiosauroid reptile.

It is entered in the Hunterian MS. Catalogue as "lx 17. Two epiphyses of the vertebræ of a Porpus." This illustrates the extent of the comparison to which Hunter submitted the nondescript fossils that he became possessed of: for, amongst the parts of the skeleton of existing vertebrate animals, there are perhaps none that resemble the present remarkably modified bone more closely than the flat terminal epiphyses of the bodies of cetacean vertebræ, when those of the coadapted surfaces of adjoining vertebræ are detached from their centrums and connected together by the drier intervertebral substance.

Locality unnoted. *Hunterian.*

271. One of the phalanges of a paddle of a Plesiosauroid reptile.

From the Kimmeridge clay, near Oxford.

Presented by the Very Rev. Dr. Buckland, F.R.S.

272. A slab of oolitic slate containing the left ischium of a *Plesiosaurus*.

The inner concave side of this bone is exposed to view: the broad and thin margin forms the symphysis with the opposite ischium, the thick and contracted end contributes to the joint for the femur.

From Stonesfield, Oxfordshire.

Presented by the Very Rev. Dr. Buckland, F.R.S.

273. The expanded distal end of the femur of a *Plesiosaurus*.

It was labelled as having been "purchased at Dr. Mason's sale."

Locality unnoted. *Hunterian.*

274. One of the phalanges of a Plesiosauroid reptile. It shows the characteristic convex pitted articular surface of the expanded extremities, indicating the ligamentous junction of the phalanges of the fin.

In the Hunterian MS. Catalogue it is entered under the class "Quadrupeds," as "a joint bone of either the foot or tail." The resemblance of the plesiosauroid phalanges to the body of a terminal caudal vertebra is very close.

Locality unnoted. *Hunterian.*

275. A digital phalanx of a Plesiosauroid reptile.

Locality unnoted. *Hunterian.*

276. One of the digital phalanges of the fin of a Plesiosauroid reptile. Hunter has been deceived by the resemblance between the fins of this extinct reptile and those of the modern Cetacea, for he has entered this specimen in his Original Catalogue as "a bone of the extremity of the Porpoise kind."

The locality is not noted. The specimen is completely petrified, and is most probably from some oolitic formation. *Hunterian.*

277. Two portions of the bones of apparently a *Plesiosaurus*, with the valves of an ostracian bivalve attached to parts of their surface.

Locality unnoted. *Hunterian.*

278. A portion of oolitic slate containing the crown of a tooth of a *Plesiosaurus*.

The thin coat of enamel shows the fine longitudinal ridges that characterise the teeth of all the species of *Plesiosauri*.

In the Hunterian MS. Catalogue this specimen is marked *r* 26, and is described as "a small Plectronites or cutter tooth, in Stunsfield stone, very perfect and fair."

From the middle oolite at Stonesfield, Oxfordshire. *Hunterian.*

279. A portion of oolitic slate, in which is imbedded a tooth of the *Plesiosaurus*.

It is marked *r* 25, and is also called a "Plectronites" in the Hunterian MS. Catalogue.

From the middle oolite at Stonesfield, Oxfordshire. *Hunterian.*

280. A slab of lias with a tooth of a *Plesiosaurus*.

The fine longitudinal ridges of the enamel are developed upon the concave side of the base of the crown, and terminate at different distances from the apex, a few of them extending one-third the length of the tooth at that part. The base of the tooth does not contract, is widely open, and exhibits an oblique vacuity on one side, caused apparently by the pressure of the matrix of a successional tooth.

From the Lias of Lyme Regis, Dorsetshire.

Presented by the Very Rev. W. Conybeare, F.R.S.

281. A portion of lias, including the fragment of a tooth of a *Plesiosaurus*. It shows the fine longitudinal ridges upon the enamel of the base of the crown, and the smooth cement upon the root of the tooth.

From the Lias of Lyme Regis, Dorsetshire.

Presented by Professor Owen, F.R.S.

282. A somewhat mutilated tooth, apparently of a *Plesiosaurus*.

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

Genus *Deirosaurus* *.

283. A plaster cast of the cervical and thoracic vertebræ, with parts of the scapular arch and interior extremities, of a Plesiosauroid reptile (*Deirosaurus italicus*).

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* From the Greek δειρὴ *neck*, and σαῦρος *lizard*; in reference to the length of the neck.

In the length of the neck and number of cervical vertebræ this reptile resembles the Plesiosauroid family, but the humerus and whole anterior extremity are longer and better developed and resemble those of the Crocodilian family. It appears to be a very interesting transitional form of reptile, but the anatomical features in this cast are too obscure to admit of a more precise determination of its nature and affinities. Upwards of twenty-two pairs of thoracic vertebral ribs are shown.

The original is from the black liassic calcareous formation at Perlito, above Verenno, near the Lake of Como.

Presented by J. B. Pentland, Esq.

Genus *Pistosaurus* *.

284. A coloured plaster cast of the cranium of the *Pistosaurus longævus*.

The original is from the Keuper sandstone in Germany.

Presented by M. Herman von Meyer, F.G.S.

Order CHELONIA.

(Tortoises, Terrapenes, Turtles: jaws toothless: body in the form of a broad case, into which the four feet and sometimes the head and tail can be retracted, the case consisting of two plates called 'carapace' and 'plastron,' formed by the thoracic vertebræ, ribs and sternum connate with dermal bony plates.)

Genus *Colossochelys* †.

285. A coloured plaster cast of the proximal end of the right humerus of a gigantic extinct Tortoise, *Colossochelys*.

The original is from the tertiary deposits of the sub-Himalaya districts, India. *Presented by Dr. Falconer, F.G.S.*

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* From the Greek πιστὸς *true*, and σαῦρος *lizard*.

† From the Greek κολοσσὸς *a gigantic statue*, and χέλυς *a tortoise*.

Genus *Emys*.

286. The right hyosternal bone of the plastron of a freshwater Tortoise (*Emys crassus*).

From the eocene tertiary deposits at Hordwell, Hampshire.

Presented by Searles Wood, Esq., F.G.S.

Genus *Trionyx*.

287. The extremity of the mandible of a Chelonian reptile, probably of the genus *Trionyx*.

From the eocene tertiary deposits at Bognor, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

288. The centrum of the atlas, commonly called 'odontoid process,' of a *Trionyx*. Its posterior articular surface is concave, its anterior one convex and transversely extended: this element remains distinct from the neurapophyses of the same vertebra.

From the eocene tertiary deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

289. A middle cervical vertebra of a larger species or specimen of *Trionyx*.

From the eocene tertiary deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

290. The seventh or eighth cervical vertebra of the same *Trionyx*. The back part of the centrum is broken away, which prevents the precise determination of its place in the series; but it shows the two convexities of the anterior end of the centrum and the broad down-bent posterior zygapophyses, characteristic of the last two cervical vertebræ in the existing species of *Trionyx*.

From the eocene tertiary deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

291. The outer extremity of a costal dermal plate, with the connate end of the rib, of the *Trionyx pustulatus*.

It is characterized by the prominence of the rib and the obliquely bevelled free border of the costal plate. The outer surface presents a strongly-marked reticulate, or rather pustular, pattern, which is continued to the beginning of the bevelled border and slopes gradually to an edge, from which the free end of the rib projects.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

292. The proximal and distal extremities of a rib, with the connate costal plate, of a small *Trionyx*.

From the eocene tertiary deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

293. Portions of the ribs and connate costal plates of a *Trionyx*: one of these exhibits the free extremity of the rib.

From the eocene tertiary deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

294. The free end of a rib, with the connate costal plate, of a large *Trionyx*.

From the eocene tertiary deposits at Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

295. A portion of a costal dermal scute, with part of the coalesced rib, of the *Trionyx gigas*.

From the tertiary formations of the sub-Himalayan mountain range.

Presented by the Rev. John Everest, M.A.

Genus *Pleurosternon**.

296. A slab of Purbeck stone, with the hinder half of the carapace of the *Pleurosternon emarginatum*. It includes the fourth to the tenth neural plates, and the fourth to the eighth pairs of costal plates: the marginal plates are wanting.

From the lower Wealden or upper oolitic 'Purbeck' beds, in the Isle of Purbeck, Dorsetshire.

Presented by Sir P. de M. Grey Egerton, Bart., M.P., F.R.S.

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* From the Greek πλευρὸν *a rib*, στέρνον *the breast-bone*; in allusion to the number of sternal ribs that enter into the formation of the plastron or under shield.

Genus *Chelone*.

297. The cranium, with portions of the carapace and plastron, and some of the bones of the extremities, of the Long-headed Turtle (*Chelone longiceps*).

The skull of this extinct Turtle differs from those of existing *Chelones* by the regular tapering of its fore-part into a prolonged pointed muzzle; but the proportions and relations of the cranial bones prove the marine character of the present fossil.

The orbits are large; the temporal fossæ are covered principally by the posterior frontals; and the osseous shield completed by the parietals and mastoids overhangs the tympanic, exoccipital, and paroccipital bones. The compressed spine of the occiput is the only part that projects further backwards. The palatal and nasal regions of the skull afford further evidence of the affinities of the present Sheppey Chelonite to the true turtles. The bony palate even presents, in a greater degree, the extent from the intermaxillary bones to the posterior nasal aperture which characterises the genus *Chelone*; and it is not perforated, as in the soft turtles (*Trionyx*), by an anterior palatal foramen. The extent of the bony palate is relatively greater than in the *Chelone mydas*, and the trenchant alveolar ridge is less deep; the groove for the reception of that of the lower jaw is shallower than in the *Chelone mydas* or the extinct *Chel. breviceps* (No. 299), arising from the absence of the internal alveolar ridge, in which respect the *Chel. longiceps* resembles the *Chel. caretta.*

The *Chelone longiceps* is distinguished from all known existing *Chelones* by the proximity of the palatal vomer to the basisphenoid, and by the depth of the groove of the pterygoid bones, and in both these characters in a still greater degree from the Trionyxes; to which, however, it approaches in the elongated and pointed form of the muzzle, and the trenchant character of the alveolar margin of the jaws.

The parts of the same skeleton, preserved with the skull and cemented together by the petrified clay, are two of the middle neural plates, and the corresponding costal plates of the right side, portions of vertebræ, with the right xiphisternal piece, the humerus and femur.

The neural plates in this specimen are flat and smooth; the entire one measures one inch two lines in length, and nine lines across its broad anterior part:—this receives the convex posterior extremity of the preceding plate in a corresponding notch. A small proportion, about one-sixth, of the anterior part of the external margin joins the second costal plate; the remaining five-sixths of the outer margin form the suture for the vertebral end of the third costal plate. In this respect the *Chel. longiceps* resembles the existing *Chelones*. The length of the third costal plate, in the fragmentary example here preserved, is three inches; the impression of the commencement of the narrow portion, formed by the extremity of the coalesced rib, is preserved. The marginal indentations of the vertebral scutes are not half a line in breadth. The transverse impression between the first and second vertebral scutes crosses the first neural plate, nine lines from its posterior extremity; the second neural plate is free, as in other *Chelones*, from any impression, being wholly covered by the second vertebral scute.

The expanded ribs are convex at the under part, slightly concave at the upper part in the direction of the axis of the shell; they slope very gently from the plane of the neural plates, about half an inch, for example, in an extent of three inches; thus indicating a very depressed form of carapace. The xiphisternal bone is relatively broader than in the existing turtles, and both the internal and external margins of its posterior half are slightly toothed. A part of the notch by which it was attached to the hyposternal remains upon the broken anterior extremity of the bone. It measures one inch two lines across its broadest part; its length seems to have been three inches and a half.

The humerus presents the usual characters of that of the *Chelones*; its length is two inches three lines; its breadth across the large tuberosities ten lines. The radius and ulna extend in this Chelonite from beneath the carapace into the right orbit; the radius is one inch and a half in length; the ulna one inch three lines in length; portions of vertebræ adhere also to the mass, the state of which indicates that the animal had been buried in the clay before the parts of the skeleton had been wholly disarticulated by putrefaction.

From the eocene deposits of the Isle of Sheppey, Kent. *Hunterian.*

298. A mass of petrified clay supporting the mutilated hinder part of the carapace of the *Chelone longiceps*. This includes the ninth and tenth neural plates,

and the expanded portions of the sixth, seventh and eighth costal plates of the right side, and exhibits the characters of the marine turtles in the great relative expansion of the tenth neural plate and the tooth-like continuation of the rib from the posterior angle of the eighth costal plate.

From the eocene deposits of the Isle of Sheppey, Kent. *Hunterian.*

299. An almost entire skull of the Short-headed Turtle (*Chelone breviceps*). A similar, sized skull of the modern edible Turtle, *Chelone mydas*, has been placed, by Hunter, with the fossil to illustrate its nature.

In general form the skull of the present species of extinct turtle from Sheppey resembles that of the *Chelone mydas* more than the other fossil turtles do from the same locality. But the cranium of the *Chel. breviceps* is relatively broader: the prefrontals are less sloping, and the anterior part of the head is more vertically truncate. The orbits are relatively larger and extend nearer to the tympanic cavity. The frontals enter into the formation of the orbit in rather a larger proportion than in *Chelone mydas*. In the *Chelone caouanna* they are wholly excluded from the orbits. The trefoil shape of the occipital tubercle is well marked: the depression in the basi-occipital bounded by the angular pterygoid ridges is as deep as in most true turtles: the lateral borders of the expanded parietals are united by a straight suture along a great proportion of their extent to the large postfrontals.

These proportions are reversed in the *Podocnemys expansa*, in which the similarly expanded plate of the parietals is chiefly united laterally with the squamosal and tympanic bones. In other freshwater tortoises the parietal plate in question does not exist.

The same evidence of the affinity of the present Sheppey Chelonite in question to the marine turtles is afforded by the base of the skull: the basi-occipital is deeply excavated: the processes of the pterygoids, which extend to the tympanic pedicles, are hollowed out lengthwise: the palatal processes of the maxillary and palatine bones are continued backwards to the extent which characterises the existing *Chelones*; and the posterior or internal opening of the nasal passages is, in a proportional degree, carried further back in the mouth. The lower opening of the zygomatic spaces is wider in the present Sheppey Chelonite than in the *Podocnemys expansa* (No. 1056, Osteol. Catal.).

The external surface of the cranial bones in the fossil is roughened by irregular ridges, depressions and vascular foramina, which give it a wrinkled or shagreen-like character. The lower jaw, which is preserved in the present fossil, likewise exhibits two characters of the marine turtles: the dentary piece, *e. g.* forms a larger proportion of the lower jaw than in the land or freshwater tortoises. The joint of the rami is completely obliterated at the symphysis, which is not longer or larger than in *Chelone mydas.*

From the eocene tertiary clay of the Isle of Sheppey, Kent. *Hunterian.*

300. A nodule of petrified clay, with a considerable portion of the bones of the head of the *Chelone convexa.*

The skull of this species differs from that of the *Chelone breviceps* in the more pointed form of the muzzle, and the less rugose character of the outer surface of the bones; it equally differs from the skull of the *Chelone longiceps* in the less produced and less acute muzzle, and the more rugose surface of the bones. The parietals are bounded anteriorly by a semicircular line, not by a semioval one, as in *Chel. longiceps,* or by an angular one, as in *Chel. breviceps.* The frontals terminate in a point between the prefrontals, but they enter into the formation of the orbits, as in both the foregoing species. The orbits are subcircular, as in *Chel. longieeps,* not subrhomboidal with the angle rounded off, as in *Chel. breviceps.* The postfrontals are large, and form a slight projection at the back part of the superorbital ridge. The tympanic cavity is larger in proportion than in the *Chelone longieeps.* The palate is traversed by a deep median, longitudinal groove, between which and the shallower grooves on the inner sides of the alveolar borders are two well-marked, diverging, longitudinal prominences. The bony palate is longer than in *Chelone breviceps,* shorter than in *Chel. longiceps.* The symphysis of the lower jaw is longer or deeper than in the *Chelone breviceps,* but is convex below from side to side, and not flattened as in the *Chelone planimentum.*

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

301. The carapace and plastron, slightly mutilated at the margins, of the Convex Turtle (*Chelone convexa*).

Part of the scapular arch and humerus, and parts of the pelvic arch and the left femur are preserved; the whole being cemented together by the petrified clay.

This species holds a somewhat intermediate position between the *Chelone breviceps* and the *Chelone longiceps*; the carapace being narrower and more convex than that of *Chel. longiceps,* broader and with a more regular transverse curvature than in the *Chelone breviceps.*

The present rare and beautiful fossil includes the first to the eighth neural plate inclusive; the first plate is expanded behind, and both posterior angles are truncated to articulate with the second costal plates. The second neural plate is quadrate, half as long again as broad, and the second pair of costal plates articulates with this, as well as with the first and third plates, as in the *Chelone longiceps.* The tooth-like extremity of the connate rib is preserved on the right side. The fourth costal is two inches four lines in length, nine lines in breadth: the angle at which the expanded part contracts to the extremity of the connate rib is well shown on the right side. The third to the eighth neural plates expand anteriorly, and have the anterior angles cut off to articulate with the costal plates in advance: they diminish in size very gradually, and the antero-lateral borders, formed by the above-named truncated angles, do not increase in length as in the corresponding plates in the *Chelone longiceps.*

All the bones, but especially the xiphisternals, are more convex on their outer surface than in other turtles, recent or fossil. The central vacuity is greater than in either of the above-described fossil species. The internal rays of the hyosternals come off from the anterior half of their inner border and are divided into two groups; the lower consisting of two short and strong teeth, projecting inward towards the extremity of the entosternals, while the rest extend forwards along the inner side of the episternals. The same character may be observed in the corresponding processes of the hyposternals, which are limited to the posterior half of their inner border. The external radiated process of the hyosternals arises from a larger proportion of the outer margin than in the *Chel. mydas,* but from a somewhat less proportion than in *Chel. breviceps.*

The external process of the hyposternal is relatively much narrower than in the *Chel. breviceps,* and *à fortiori* than in *Chel. longiceps.* The straight, transverse section, by which the hyosternals and hyposternals of the same side are joined together, is much shorter than in the other fossil *Chelones,* and is similar in extent to that in *Chel. mydas*; but the following differences present themselves in the plastron of the *Chelone convexa* as compared with that of the *Chelone mydas*.

The median margin of the hyosternals forms a gentle curve, not an angle; that of the hyposternals is likewise curved, but with a slight notch. The longitudinal ridge on the external surface is nearer the median margin of the hyosternals and hyposternals, and is less marked than in the *Chelone longiceps*, especially in the hyposternals, which are characterized by a smooth concavity in the middle of their outer surface. The suture between the hyosternals and hyposternals is nearer to the external, transverse, radiated process of the hyposternals. The median vacuity of the sternal apparatus is elliptical in the *Chel. convexa*, but square in the *Chel. mydas*.

The characteristic lanceolate form of the episternal bone in the genus *Chelone* is well seen in the present fossil. The entosternal element of the plastron is subcircular or lozenge-shaped, and generally broader than it is long in the Emydians. The true marine character of the present Sheppey Chelonite, so well given in the carapace and plastron, is likewise satisfactorily shown in the small relative size of the entire femur, which is preserved on the left side, attached by the matrix to the left xiphisternal bone. It presents the usual form and slight sigmoid flexure characteristic of the *Chelones*.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

302. A mass of petrified clay, with a portion of the carapace, including the third, fourth, fifth and sixth neural plates, and parts of the third, fourth, fifth and sixth costal plates, of a Turtle, probably the *Chelone subcarinata*.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

303. A centrum of a dorsal vertebra of a fossil Turtle (*Chelone*).

It shows the characteristic Chelonian modifications, in its length, median compression, deep neural groove and four neurapophysial surfaces for the moieties of two pairs of neurapophyses, which, in the carapace, shift their relative position to their proper centrum.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

304. A somewhat mutilated cuirass of the *Chelone latiscutata.*

The carapace includes the first to the sixth neural plates, with the corresponding pairs of costal plates: the plastron includes the hyosternal and hyposternal elements, with the beginning of the xiphisternals, and the pointed end of the entosternal. This species resembles the *Chelone longiceps* in the form of the carapace, and especially in the great transverse extent of the hyo- and hypo-sternal elements of the plastron; but it differs from that and other known species of extinct turtles in the greater relative breadth of the vertebral scutes, the impressions of which remain on the petrified neural and costal plates, showing that they were twice as broad as long.

The cavity of the cuirass is occupied by a mass of petrified clay. The central vacuity of the plastron is relatively wider than in the *Chelone longiceps*, but this may be a character due to the immaturity of this small specimen.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

305. A mass of petrified clay which has filled the cavity of the osseous buckler of a Turtle, showing on one side the impressions of the inner surface of the carapace, and on the other having attached to it a considerable proportion of the plastron. The proportions and degree of convexity of the under surface of the costal plates of the carapace correspond with those parts in the *Chelone crassicostata.* The remains of the plastron include the left hyosternal, left hyposternal, and left xiphisternal: the latter is articulated to the hyposternal by a notch receiving a toothed process, and reciprocally. The hyosternal is concave lengthwise and is convex across on its under surface; the transverse linear impression, dividing the pectoral and abdominal scutes, crosses near its posterior border. Impressions of the toothed mesial border of the right hyosternal remain, and part of the toothed margin of the left hyposternal.

From the eocene formations of Harwich, Kent.

Presented by Frederick Dixon, Esq., F.G.S.

306. A mass of the cretaceous stone from Maestricht, in which is imbedded a fragment of the fore part of the carapace of a gigantic extinct Turtle (*Chelone Camperi*).

It includes the nuchal plate, the right anterior marginal, and part of a costal plate, with the inner side exposed. A part of the ridge from this surface of the nuchal plate is shown to which the neural spine of the first of the vertebræ of the carapace has been joined.

One of the earliest indications of the occurrence of fossil Turtles (*Chelones*) in the formations of the Cretaceous period, is given by the celebrated anatomist Camper, in a "Memoir on the Petrifactions found in St. Peter's Mount, Maestricht*," where, referring to some specimens which he had procured for the British Museum, he writes :—"Another very beautiful specimen, a foot and a half long, and about ten inches broad, I have been induced to add, because it contains the anterior part of the scutum of a very large Turtle. Of this Mr. John Hunter has an analogous bone from the same mountain in his valuable collection, but sent to him under another name. I am convinced it belonged formerly to a Turtle; first, because I have from the same mountain the entire back of a Turtle, four feet long and sixteen inches broad, a little damaged at the sides, and a pretty large fragment of another Turtle in my possession: secondly, because I have a similar one, but so placed within the matrix, as to show the inside of that piece in the back of a large Turtle I got in London, by the favour of Mr. Sheldon: thirdly, because I have amongst these bones the lower jaw-bone of a very large Turtle, of which the crura, though not entire, are seven inches long, and distant from one another six inches; the thickness is equal to one inch and a quarter†." The present specimen is most probably the one alluded to by Camper. It is entered in the Hunterian MS. Catalogue as "*o* 14. A large mass of stone from Maestricht, with a prodigious large rib of a bird." This is doubtless the misnomer to which the Dutch anatomist alludes. It is possible that the specimen may have been entered provisionally with the name under which it was transmitted to Hunter. There is a superficial resemblance in outward form to a Bird's rib; but the uniformly coarse cancellous texture is that which characterizes the skeleton of the reptile to which the sutures and other modifications show this specimen to have belonged.

From the cretaceous formations at St. Peter's Mount, Maestricht.

Hunterian.

307. A mass of the cretaceous stone from Maestricht, supporting one of the marginal plates of the carapace of the same gigantic species of Turtle (*Chelone Camperi*).

From the cretaceous formations of St. Peter's Mount, Maestricht.

Hunterian.

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[*] Philosophical Transactions, 1786.

[†] Ibid. p. 450.

Order LACERTIA.

(Lizards, Chameleons, Iguanas: body scaled, with four feet: transverse processes single on each side of the cervical and anterior dorsal vertebræ.)

Genus *Protorosaurus*[*].

308. A block of the Kupferschiefer, of the Zechstein formation, from the mines near Eisenach, Germany, containing part of the skeleton, and the impression of the skeleton of the *Protorosaurus Speneri*.

The vertebral column is bent, so that the skull touches the base of the tail: the cervical vertebræ are remarkably large and powerful, and near them are preserved some slender intermuscular ossicles. The vertebræ at the base of the tail have long and simple compressed spines: these processes, after the tenth caudal vertebra, begin to expand at their summits, then to show a notch in the expanded summit, which deepens until it divides the spine into two distinct diverging processes.

This specimen is described and figured in the 'Miscellanea Berolinensis ad incrementum Scientiarum, ex Scriptis Soc. Reg. exhibitis, Berol. 1710, p. 92, figs. 24, 25.' It is entered in the Hunterian Manuscript Catalogue as follows:—"*m.* 7. The very specimen of which Spener wrote a treatise 'De Sceleto Crocodili in Lapide,' and which passed into Dr. Woodward's collection, and was ultimately sold in the sale of Humphrey's Museum."

Hunterian.

Genus *Dicynodon*[†].

309. A coloured plaster cast of the skull of the *Dicynodon lacerticeps*.

The remarkable peculiarities of the skull of this extinct reptile, which is from a formation in South Africa, apparently as ancient as the Zechstein of the Permian system of Europe, call for the following remarks, which have been recorded after an examination and comparison of the original specimen now in the British Museum.

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[*] From the Greek πρῶτος *first*, ὧρος *period*, σαῦρος *lizard*; in allusion to the remains of this Saurian having been found in the earliest geological periods in which, when that name was proposed, remains of air-breathing vertebrated animals had occurred. Fossil Saurians have since been detected in older or earlier formations.

[†] From the Greek δὶς *two*, κυνόδους *canine tooth*; in reference to the two canine teeth or tusks which in this singular genus of extinct reptile exclusively represent the dental system.

The occipital region of this skull is well preserved, and is formed by a moderately broad, triangular, vertical, continuous wall of bone, overhung by an angular horizontal ridge, about half an inch in breadth, and shaped like the penthouse of a gable-end; this ridge is formed by the superoccipital, the parietal, and the mastoid bones.

This character is peculiar to the Crocodilians among existing Reptilia. The Chelonians all present a strong and long spine developed backwards from immediately above the foramen magnum. The Lacertilians and Ophidians have two wide vacuities in the occipital region, overarched by the elongated mastoids, which in Serpents are prolonged backwards. In the Batrachians the low and narrow occipital region slopes directly forward from the great foramen, and presents also another and more decisive difference in the two condyles for the articulation of the head with the vertebral column, and their lateral position in respect of the occipital foramen.

This foramen in the *Dicynodon lacerticeps* is oval, with the large end downwards: its lower fourth is bounded by a single subhemispherical, convex, articular condyle, which was partly broken away in the specimen. The upper angles of the condyle are separated by a smooth depression from two small obtuse prominences, projecting one on each side of the middle of the great foramen, immediately below the suture which divides the exoccipitals from the superoccipital.

In the Crocodiles the single condyle is formed almost exclusively by the basioccipital, and its upper angles are not continued upon the sides of the foramen. In the Chelonians, the three elements of the occipital bone contribute to form the condyle, as in Lizards and the Dicynodon; but they project backwards from the floor of the cranial cavity before forming the articular convexity, which constitutes no immediate part of the foramen magnum. The shape of the foramen itself in the Chelonians is more like that of the Dicynodon than it is in the Lizards. In the Chelonians the lower three-fourths of the foramen is formed by the exoccipitals; in the Crocodilians, the upper three-fourths. In the Dicynodon the basioccipital forms a very small part of the foramen magnum; the exoccipitals constitute the rest of its lower half, and it is completed above by the broad and high superoccipitals. In the Crocodilians this element is excluded from any share in the formation of the foramen magnum. The Dicynodon, therefore, in the essential anatomical characters of the occipital region of the skull, and in its shape, chiefly due to the angle formed by the overhanging parieto-mastoid ridge, adheres to the Lacertilian type; but, in the extent and ossification of this region, it resembles the Crocodilia. It is not, however, devoid of characteristics peculiar to itself: the broad semicircular lower half of the occiput sends out a series of short and thick equidistant processes, like rays. Two are continued downwards and a little outwards from the infero-lateral parts of the basioccipitals: above these, the longer and stronger paroccipital processes extend outwards and a little downwards to abut against the lower ends of the tympanic pedicles: the next process above is a narrower and shorter one, which projects from the upper and outer angle of the paroccipital into the interspace separating it from the tympanic bone; but apparently without effecting a junction with that bone: the fourth radiating process on each side forms the prominent angle of the triangular superoccipital plate, and abuts against the mastoid bone. The condyloid foramen is large, and is pierced on each side of the single condyle; not, as in the Crocodiles, above that prominence.

The cranium proper is scarcely more than two-thirds the breadth of the interorbital space. But the temporal vacuities on each side are divided by a strong ridge of bone from the orbits. This transverse bar or ridge is chiefly formed by the postfrontals, which are not produced backwards, as in most Lizards: neither do the mastoids join the postfrontals to overarch any part of the temporal spaces, as in Crocodilians; but they are confined to the posterior circumference of those spaces, which are bounded or overarched laterally by a single bridge, formed chiefly by the squamosal bones. In the strength of these bones and their continuation from the lower part of the postorbital wall, the Dicynodon much more resembles the Crocodilians, especially the extinct forms, than it does the Lacertilians: the zygomatics are nevertheless continued, as in most Lacertilians, to the upper, and not to the lower end of the tympanic pedicles, as they are in the Crocodiles.

The part of the single narrow parietal bone which separates the temporal fossæ from each other is impressed on each by an oblique smooth tract, indicating the origin of the strong temporal muscle; the upper boundary ridges of the tracts almost meet along the posterior half of the parietal, but diverge as they advance forwards and curve outwards, to be continued upon the postfrontals. The intermediate flat, triangular space of the parietal, included by these diverging lines, is perforated by a small elliptical foramen: this character of the parietal bone is peculiar, amongst existing reptiles, to the Lacertia, though far from being constant in the order. They are relatively stronger than in most Lizards, but are less robust and longer than in the Crocodiles and Chelonians, in which the tympanic pedicles are wedged immoveably into the interspace of surrounding bones, and in the Crocodilia extend obliquely downwards and backwards. The position of the tympanic pedicles, and their comparatively free suspension, are very characteristic of the Lacertilian affinities of the Dicynodon. They terminate below by a broad and slightly convex condyle, looking downwards and forwards, for articulating with the lower jaw, and near this part receive abutments from the paroccipital and sphenoid bones.

The form of the temporal fossæ is a wide oval, with its long axis almost parallel with that of the skull. The orbits are large and almost circular, with a complete bony frame or boundary. In the present species (*D. lacerticeps*) they are relatively as large as in most Lizards, and larger than in Crocodiles. Their position, equidistant from both ends of the skull, is also a Lacertilian character: in the Crocodiles the orbits are nearer the back part, in the Chelonians they are nearer the fore part of the skull.

The interorbital part of the surface of the skull is one-third broader than the intertemporal region, or true cranium, and gradually expands as it extends forwards. The contour of this part of the skull descends into the nasal region by a gentle convex curve: the surface is a little depressed along the middle, and rises into a slight protuberance at the fore part of the supraorbital boundary, which is formed by the prefrontals. The midfrontal is divided by a median suture, as in the Varian Lizards and the Chelonia: it is a single bone in the Crocodiles. In the Dicynodon, as in the Iguanas and American Monitors (*Thorictes*, *Tejus*, &c.), the midfrontal forms the middle two-thirds of the superorbital ridge: the posterior part of this ridge and the upper half of the posterior rim of the orbit are contributed by the postfrontal, which forms the medium of union between the midfrontal, parietal, malar and zygomatic bones. The malar and superior maxillary bones appear to be indistinguishably blended together below the orbit, where they swell out in an unusual degree, and carry the floor of the orbit much beyond the roof; turning the aspect of the plane of the orbit obliquely upwards and outwards, as in Crocodiles, and rendering it less vertical than in most Lizards. The fore part of the orbit is bounded by the lachrymal bone, which is extended upon the face, apparently as far as to the back part of the nostril, in the present species. A single moderately large lachrymal foramen is pierced just within the brim of the orbit, and defended by a protuberance of the lachrymal bone in front of it.

The bony anterior apertures of the nasal cavity are separated above by a space two-thirds of an inch in breadth, and formed principally by the nasal bones, between the anterior ends of which the median ascending process of the intermaxillary bone is wedged: they are situated about half an inch in advance of the orbits, are defined above by a sharp overhanging border of the nasal bones, and the lower boundary, which is formed by the superior maxillaries, is rounded off into the nasal cavity; the plane of the opening being much nearer the perpendicular than is that of the orbit. The shape of the nasal opening is a longitudinal ellipse. A very remarkable feature of the present fossil cranium is the swelling out of the superior maxillary and malar bones below the orbits, which part is the *point d'appui* of four strong bony columns: one of these is formed by the lachrymal and prefrontal, and descends in front of the orbit; a second, formed by the malar and postfrontal, descends behind the orbit; the third, formed by the zygomatic, extends longitudinally from the back part of the malo-maxillary protuberance to the tympanic pedicle; the fourth, contributed by the 'os transversum,' is continued from the under part of the maxillary bone, anterior to the orbit, downwards, backwards and inwards to abut against the pterygoids. The superior maxillary bone commences anteriorly by a suture, very distinctly shown in a specimen of the cranium of the *Dicynodon testudiceps*, which extends down from the rostral to the alveolar border of the upper jaw; the bone extends backwards, forming the lower border of the nostril, and uniting with the lachrymal bone, as it passes to the lower part of the orbit; then expanding rapidly, as it proceeds, to coalesce with the malar bone. This expanded suborbital part of the maxillary bone or malo-maxillary bone, supported by the four convergent stout osseous columns above described, is excavated by a wide and deep alveolus, with a circular area lodging a long and strong, slightly curved and sharp-pointed canine tooth or tusk, which projects about two inches from the open extremity of the produced socket. The direction of the tusks is forwards, downwards, and very slightly inwards; the two converging as they descend along the outer side of the compressed symphysis of the lower jaw.

The fore part of the upper jaw has been longer and more compressed than in the other recognizable species of the bidental genus, and no trace is perceptible of any other teeth than the two long canine tusks above described. A shallow cavity, cut obliquely in the posterior part of the lower jaw, receives the corresponding slight convexity at the end of the tympanic pedicle. Thus attached, the lower jaw has been cemented by the surrounding rock in its natural position, but with the mouth a little open.

The lower jaw manifests, by its great depth as compared to its length, and by its edentulous condition, a close and important relationship with the Dicynodon and Rhynchosaur; but it appears, however, to have differed from the lower jaws of all other known recent and extinct reptiles, by the evident traces of a strong longitudinal ridge projecting outwards from the middle of the external surface of each ramus. There is no trace of teeth or their sockets in the lower jaw of the *Dicynodon testudiceps*: so much of the alveolar border as is exposed presents a smooth and even edge, which seems to have played like a scissor blade upon the inner side of the corresponding edentulous border of the upper jaw; and it is most probable, from the analogies of similarly shaped jaws of existing Reptilia, that the fore part of both upper and lower jaws were sheathed with horn.

Until the discovery of the *Rhynchosaurus*, this edentulous and horn-sheathed condition of the jaws was supposed to be peculiar to the Chelonian order among Reptiles; and it is not one of the least interesting features of the Dicynodon of the African sandstones, that it should repeat a Chelonian character, hitherto peculiar amongst Lacertilians to the remarkable extinct edentulous genus of the new red sandstone of Shropshire: but our interest rises almost to astonishment, when, in a Saurian skull, we find superadded to the horn-clad mandibles of the Tortoise a pair of tusks, borrowed as it were from the Mammalian class, or rather foreshadowing a structure, which in the present existing creation is peculiar to certain of the highest organized warm-blooded animals.

The original is from a Permian(!) formation in South Africa.

Presented by A. G. Bain, Esq.

310. A coloured plaster cast of the anterior two-thirds of the lower jaw of the *Dicynodon lacerticeps.*

The original, now in the British Museum, offers the following interesting structure.

The dentary piece, which forms the whole of the strong and large simple symphysis, commences in each ramus behind by a bifurcate extremity, the upper fork reaching to the posterior third of the ramus. It there joins the surangular, and increasing in thickness as it advances forward soon joins the coronoid, and now takes on a trihedral form, the outer angle forming the stronger outer ridge before described: it also increases in depth, and at the last section the upper and lower forks have united; the lower fork forming the thin plate of bone applied to the outer side of the angular piece, and fitting into the angular notch in that bone. About half an inch anterior to the bifurcation, the portions of the dentary in each ramus unite to form the symphysis, which has already been described, and which shows no trace of median suture. A considerable vacuity occupies the substance of each ramus, bounded at the middle of the ramus by the dentary and angular pieces externally, by the splenial and coronoid pieces internally, by the surangular and coronoid above, and the interlocked opercular and angular pieces below. This vacuity communicates with the external surface in the form of a narrow elongate fissure, bounded anteriorly by the two forks of the dentary, and behind by the upper fork of the dentary, the surangular and the angular pieces. This fissure appears to have been closed on the inner side of the ramus by the splenial or opercular piece.

The alveolar border of the lower jaw is slightly grooved, as in the *Trionyx*; the outer border of the groove being most produced, and forming the trenchant edge. In the edentulous character of the alveolar border, in the anchylosed symphysis, in the depth of the rami and its general form, the lower jaw most resembles that of the Chelonian reptiles. In the external fissure above described, and the posterior bifurcation of the dentary piece, it resembles the lower jaw of the Crocodile; but in the more essential characters of its composition it agrees more closely with the Lacertian type of the same bone. Thus the angle of the jaw is formed by the articular, not by the angular piece, as in the Crocodile: the coronoid or complementary piece, instead of the insignificant size to which it is reduced in the Crocodiles and most Chelonians, presents proportions surpassing those of most Lacertians: the upper margin for the attachment of the temporal muscle is intermediate in height between that in the Crocodiles and the more angular elevation of the coronoid in most Lizards. In the proportion of the dentary to the other elements of the composite bone, the Dicynodon resembles the Lacertians, the dentary piece forming a much larger proportion of the lower jaw in the Crocodiles and Chelonians; but the entire structure of the bone exemplifies, as remarkably as the rest of the skull, the singular engrafting of Crocodilian and Chelonian characters upon an essentially Lacertian basis.

The original is from a Permian (?) formation in South Africa.

Presented by A. G. Bain, Esq.

311. A coloured plaster cast of the anterior two-thirds of the cranium and face of the *Dicynodon testudiceps*.

This specimen, on which the above-named, or tortoise-headed, species of Dicynodon was founded, is the anterior two-thirds of a skull, without lower jaw; including the nostrils, the orbits and the bony palate, with the anterior and posterior palatal apertures.

It differs in a readily appreciable and well-marked degree from the last-described skull of the *Dicynodon lacerticeps*, by the greater breadth and less length of the facial part of the skull, by the smaller orbits and larger nostrils, and by the greater declivity of the contour of the internasal and intermaxillary regions. In *D. lacerticeps* the profile of the internasal plate is continued from the interorbital region, with a slight declivity, almost straight to the intermaxillary bone. In *D. testudiceps* the profile bends down directly from the interorbital region, and rapidly descends to the edentulous border of the intermaxillary bone. The distance from the posterior border of the orbit to the anterior border of the nostril is rather less in the *Dicynodon testudiceps* than it is in *D. lacerticeps*; but the breadth between the supraorbitary ridges in *Dicynodon testudiceps* is greater, being one inch and two-thirds, and that between the supranasal ridges is one inch. The general size of the two fossil skulls compared must have been nearly alike: their specific difference will be obvious from the comparisons above made: the generic identity of the shorter and broader-headed species is shown by the bases of the two large tusks which remain in the sockets of the expanded maxillaries, their exserted crowns having been broken off.

The breadth and shortness of the skull, the sudden convex declivity of the rostral part, and the sharp vertical, edentulous border of the wide intermaxillary bone, are features of resemblance to the skull of the Tortoise which would at once strike the anatomist acquainted with the peculiar form of that part of the skeleton of the Chelonian reptile; and they have suggested the specific name proposed for the present species. But differences of a more essential nature present themselves on a closer comparison. Where the orbits look out from the Tortoise's skull, the anterior nostrils open in that of the Dicynodon: where the single nostril is perforated in front of the skull of the Tortoise, there is a broad, convex, solid wall of bone in the Dicynodon.

The resemblance to the Tortoise is due merely to modifications of proportion and shape of the bones; in the essential anatomical structure of the skull, the present fossil agrees with the more complete skull of the *Dicynodon lacerticeps*: and seeing in both the same aspect of the orbits, the same lateral position of the two distinct nostrils, the same expansion of the maxillary bones with their singular dental weapons, it may be concluded, that the parts which are complete in the skull of one species must have differed from those which are mutilated or wanting in the other species, only in their form and proportion, and not by any essential anatomical modifications. With this conviction, the entire and well-preserved intermaxillary and palatal region of the skull of the *Dicynodon testudiceps* gives important additional evidence of the nature and affinities of the extinct genus.

All the Crocodilia retain the median suture of the intermaxillaries; most of the Chelonia likewise retain it: in neither order is there any median ascending intermaxillary process. The Ophidians and most of the Lacertians possess a single intermaxillary bone, which sends a median process upwards to the interspace dividing the nostrils. In these orders the type of the intermaxillary bone of the Bird is foreshadowed, but the size of the bone is very diminutive as compared with Birds.

In the portion of the skull of the *Dicynodon testudiceps* the whole extent and structure of the premaxillary bone is clearly displayed: there is no trace of median suture on either the external or palatal portions of the bone: it has a median ascending branch, which, at the middle emargination of its upper sinuous border, receives the extremities of the nasal bones: as it descends from the internasal space it expands, and at the fore-part of the lower border of the nasal aperture meets and joins the superior maxillary bone. The Dicynodon, by the superior size of the intermaxillary bone, pushes the resemblance of its cranial organization to that of Birds much further than do the other Reptilia with the same undivided condition of that bone. I may here however remark, that some of the ancient Saurians, more especially the marine forms, are remarkable for the greater proportion of their divided intermaxillaries than is manifested by the modern Crocodilia. The inferior trenchant border of the intermaxillary bone in the *Dicynodon testudiceps* describes nearly a semicircle horizontally, between the sutures with the maxillary bones. The middle part of the edentulous border is a little produced and strengthened by two short and narrow buttresses of bone on the inner side, dividing that part of the wall of the mouth into a narrow and deep median depression and two wide and shallow lateral depressions, bounded posteriorly by the inward prominence of the sockets of the great maxillary tusks.

A second and more peculiar feature of the palatal region is a longitudinal ridge, formed by the vomer, which descends from the middle line, commencing one inch behind the anterior border of the intermaxillary, and after an extent of one inch and a half, subsiding close to the fore-part of the posterior nasal aperture. The vomerine ridge, at its middle part between the sockets of the tusks, is about half an inch in depth: it must strengthen the palatine vault or arch of bone, just as similar appendages of a Gothic roof are introduced to give additional strength as well as ornament. We may therefore regard this structure as physiologically related to the uses of the tusks of the Dicynodon.

There are no clear or well-defined traces of anterior palatine apertures in the present fossil; an unbroken vault of bone seems to extend from the edentulous border of the intermaxillary and the great maxillary alveoli to the single median vacuity, which I take to be the posterior outlet of the nasal cavity. This is of an oval form, one inch two-thirds long, one inch broad, with the great end behind: there is a shallow longitudinal depression on each side of the fore-part of the aperture; the inner border of the depression, formed by the palatine and ento-pterygoid, is produced into a ridge, but supports no teeth; the outer boundary of the depression is formed by apparently the os transversum or exopterygoid, which thence extends outwards and forwards to abut against the back part of the alveolar border of the maxillary. In the place of the depressions, we find in some Lacertians, as *Varanus niloticus*, perforations, corresponding with the larger vacuities in the same part of the palate in the Crocodilians. If, as appears from the carefully exposed palatine surface of the fossil under description, that surface is imperforate anterior to the large median aperture, the condition of the bony palate is essentially the same as in the genera *Testudo* and *Chelone*; but the anterior, imperforate tract of bone is much more extensive in Dicynodon. In some *Emydes*, and in *Trionyx*, where the palatal bony roof is of greater extent, it is perforated by an anterior median aperture just behind the intermaxillary border. An analogous aperture is present in the Crocodilians, which is indubitably not the case with the Dicynodon.

The palate in existing Lizards presents two anterior palatal apertures besides the single large median posterior vacuity; and most of them have likewise two lateral vacancies, bounded internally by the vomerine and palatine bones, externally by the maxillary bones: the *Varani* have, besides, the pterygoid lateral perforations. Of none of these characters is there any trace in the present specimen. The resemblance to the Chelonian type of cranium, so strikingly exemplified in the edentulous lower jaw and intermaxillary border, seems therefore to have extended to the composition of the bony palate.

In the upper surface of the skull, the region between the upper border of the ascending process of the intermaxillary and the middle of the interorbital space is formed by a broad rhomboidal tract, including the nasal, prefrontal, and part of the midfrontal bones: the median suture dividing the latter is discernible. The rhomboidal tract has a more unequal surface than the corresponding narrower part of the skull of the *Dicynodon lacerticeps*: the prominences developed from the prefrontals at the anterior part of the orbits are more marked, and they are divided by depressions from an intermediate prominence at the middle of the tract. The interorbital tract is traversed by two longitudinal shallow channels, divided by a median gentle longitudinal rising, and bounded laterally by the raised supra-orbital ridges.

The back part of the cranium has been broken away from the present skull through the parietal foramen, and just behind the commencement of the smooth depressions that mark the origins of the strong temporal muscles. The thickness of the parietal bone at this part is nearly half an inch; such strength of the cranial bones is both a Chelonian and Crocodilian character. The orbits have a smaller vertical diameter than in the *Dicynodon lacerticeps*; their lower boundary is thick and rounded off: a gradually widening and nearly flat floor of the orbit extends obliquely inwards, downwards and backwards; the lower boundary of the orbit extends straight, outwards and backwards, for two inches; forming, at the fractured end, the beginning of the zygomatic arch, but showing no tendency to curve upwards here, to form the posterior boundary of the orbit, nor any mark of union with such a boundary: if this boundary was completed, as is probable from the analogy of the preceding specimen, posterior to the fractured part of the zygomatic arch, the antero-posterior diameter of the orbit must have been both absolutely and relatively greater than in the *Dicynodon lacerticeps*. The *Crocodilia* and *Ophidia vera* have no bony floor to the orbit: most *Lacertia* and *Chelonia* have that structure, but it is much closer to the palate than in the Dicynodon. The expansion of the malo-maxillary bone both vertically and transversely, to form the socket for the tusk, gives a peculiar form and development to the under part of the orbit of the bidental reptiles of the African sandstones, which will be readily appreciated by comparison of the present specimen or the figures with the skull of any existing reptile; it will be seen, however, that it is merely an adaptive modification, in subordination to the support of the tusks, which gives so mammalian a character to this part of the skull of the Dicynodon.

The original is from a Permian (?) formation in South Africa.

Presented by A. G. Bain, Esq.

312. A coloured plaster cast of the facial part of the skull of the *Dicynodon strigiceps*.

This species is founded on the anterior or rostral part of a skull here displayed, which, in proportion to its height and breadth, is as much shorter than that of the *Dicynodon testudiceps*, as this is in comparison with the skull of the *Dicynodon lacerticeps*. The breadth of the interorbital space is equal to that in the *Dicynodon lacerticeps*, but it is more concave; it is less than that of the *Dicynodon testudiceps*, and there is no median longitudinal rising, as in that species. The breadth between the upper and posterior part of the nostrils is equal to that in the *Dicynodon testudiceps*; but the rostral contour, continued from the horizontal interorbital tract, describes, in descending, a semicircular curve, convex forwards, and with the lower part bending back to form the alveolar, or rather edentulous trenchant anterior border of the mouth.

This form of muzzle not only distinguishes the present species from its congeners, but is unique in the Reptilian class. The orbits, with prominent anterior borders, are thus brought close to the fore-part of the head; the nostrils, instead of being in front of the orbits, are beneath them: the physiognomy of the old reptile must have resembled that of the Owl, with its horny beak curving downwards and backwards from between the advanced eyes; which resemblance is indicated by the proposed specific name. The outer surface of the convex internasal ascending process of the intermaxillary is smooth, entire, showing a slight median longitudinal prominence. The anterior boundary of the palate does not describe so true a semicircle as in the *Dicynodon testudiceps*, but is semi-elliptic, being narrower across the commencing expansions, apparently of the alveoli, in proportion to the distance from that transverse line to the fore-part of the alveolar border. In the two preceding species the tusks project from beneath the fore-part of the orbit, or between this and the nasal opening: if the present species possessed the tusks, they must have projected opposite or from beneath the back part of the orbit, the floor of which is remarkably prolonged backwards and outwards; but the mutilation of the skull at this part has destroyed its true generic character. The prefrontal bones are unusually developed, and descend lower than usual to form the anterior prominence of the orbits; the facial plates of the superior maxillary bones incline inwards as they descend from the orbits: the lachrymal bones form the upper border of the nasal orifice, and the nasals and ascending intermaxillary bone form the anterior borders. The lateral branches of the intermaxillary bone form a thick convex inferior border bending in to the nasal aperture immediately above the alveolar edge: the facial plate of the superior maxillary slopes into the nasal cavity from behind. Although the present fragment, on which the *Dicynodon strigiceps* is founded, includes a smaller portion of the skull than that belonging to the *Dicynodon testudiceps*, the distinctive features of the species are more striking and more strongly marked: it ought perhaps to be referred, in the absence of decisive evidence of the maxillary tusks, to a distinct genus of Saurian reptile.

The original is from a Permian (?) formation in South Africa.

Presented by A. G. Bain, Esq.

Genus *Geosaurus* *.

313. A coloured plaster cast of a portion of the crushed skull of the *Geosaurus giganteus*.

In this large extinct Saurian the teeth have compressed crowns, trenchant at the fore and back part, pointed, and slightly bent backwards. The hindmost teeth extend to beneath the orbit, as in the Crocodiles and Monitors. Some of the sclerotic plates of the eye are preserved in the left orbit, which indicates a nearer affinity to the Monitors than to the Crocodiles.

The original of this cast is figured by Cuvier in the 'Ossemens Fossiles,' tom. v. part 2. p. 343. pl. 21, and is from an upper oolitic formation, called "White Jura," near Monheim, in Franconia.

Presented by Charles Stokes, Esq., F.R.S.

314. A coloured plaster cast of thirteen vertebræ, including the sacral, lumbar and

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* From the Greek γῆ *earth*, and σαῦρος *lizard*; a name given by Cuvier to a large extinct Saurian, described by Soemmerring under the name of *Lacerta gigantea*.

posterior dorsal, of the *Geosaurus giganteus.* The centrums in the dorsal region are compressed and concave at the sides; they expand in the vertebræ which approach the sacrum. The diapophyses have their bases much extended antero-posteriorly, and are of great length. The sacral pleurapophysis articulates to the interspace between the first sacral and last lumbar vertebræ.

The original is from an upper oolitic deposit, near Monheim, in Franconia.

Presented by Charles Stokes, Esq., F.R.S.

315. A portion of coral ragstone, with a tooth of the *Geosaurus maximus.*

The crown is long, moderately slender, divided into an outer, less convex, and an inner, more convex surface, by two lateral, opposite, trenchant and finely serrated edges. The enamel is smooth, with very fine longitudinal lineations; the base of the tooth is wide and short.

From the upper oolite, near Monheim, in Franconia.

Presented by Professor Kurr.

Genus *Mosasaurus**.

316. A coloured plaster cast of a great proportion of the cranium, with a few vertebræ and a portion of a rib, of the great Maestricht Saurian or Lizard of the Meuse (*Mosasaurus Hoffmanni*).

The right ramus of the lower jaw, which is entire, measures four and a half feet in length; it crosses the articular extremity of the left ramus: with these are preserved large portions of both maxillary bones; the pterygoid bones, which, as in the Iguana, support a row of small teeth; and the left tympanic bone.

This extinct species has been very appropriately named after its discoverer, Dr. Hoffmann, of Maestricht, surgeon to the forces quartered in that town in 1780. This gentleman had occupied his leisure by the collection of the fossils from the quarries, which were then worked to a great extent at Maestricht for a kind of yellowish stone of a chalky nature, and belonging to the most recent of the secondary class of formations in geology. In one of the great subterraneous quarries or galleries, about five hundred paces from the entrance, and ninety feet below the surface, the quarrymen exposed part of the skull of the Mosasaurus, in a block of stone which they were engaged in detaching. On this discovery they suspended their work, and went to inform Dr. Hoffmann, who, on arriving at the spot, directed the operations of the men, so that they worked out the block without injury to the fossil; and the doctor then, with his own hands, cleared away the matrix and exposed the jaws and teeth.

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* A hybrid compound from *Mosa*, the river Meuse, and σαῦρος *a lizard*; indicative of the locality, Maestricht on the Meuse, where the chief remains of this gigantic marine lizard have been found.

This fine specimen, which Hoffmann had added with so much pains and care to his collection, soon, however, became a source of chagrin to him. One of the canons of the cathedral at Maestricht, who owned the surface of the soil beneath which was the quarry whence the fossil had been obtained, when the fame of the specimen reached him, pleaded certain feudal rights to it, and obtained possession of the unique specimen. When the French army bombarded Maestricht in 1795, directions were given to spare the suburb in which the famous fossil was known to be preserved; and after the capitulation of the town it was seized and borne off in triumph. The original has since remained in the Museum of the Garden of Plants at Paris.

Presented by the Professors Administrators of the Jardin des Plantes, Paris.

317. The centrum of a dorsal vertebra of the *Mosasaurus Hoffmanni*. The neurapophyses have coalesced with the centrum, but the neural arch has been broken away, displaying a narrow neural canal. The anterior articular surface is gently and regularly concave, the posterior one convex: both are of a subtriangular form, with the angles rounded off, the base downwards. The under surface of the vertebra is broad and flat: the parapophyses extend from the anterior three-fourths of the sides of that surface; they have been broken off, and all the fractured surfaces of this vertebra display a moderately fine and uniform cancellous texture, covered, where the bone is entire, by a very thin smooth crust of osseous matter.

From the upper cretaceous formations near Maestricht. *Hunterian.*

318. A nodule of the cretaceous rock of Maestricht, in which is partially imbedded a tooth of the *Mosasaurus Hoffmanni*. It is five inches in length, the enamelled crown being two inches. The implanted base expands, assumes an oval, transverse section, and terminates obtusely with a small remnant of a pulp-cavity. It consists of a coarse osseous substance externally, perforated by

numerous small vessels, and commonly becomes anchylosed with the surrounding bone of the jaw.

From the upper cretaceous formations near Maestricht. *Hunterian.*

319. A portion of the yellow cretaceous rock from Maestricht, in which is imbedded one of the small teeth, probably from the pterygoid bone, of the *Mosasaurus Hoffmanni.*

The skull of the Mosasaurus is shown by No. 316. to have measured four and a half feet long, and two and a half feet wide. The large pointed teeth on the jaws are very conspicuous; but, in addition to these, the gigantic reptile had teeth on a bone of the roof of the mouth (the pterygoid), like some of the modern lizards. The entire length of the animal has been estimated at about thirty feet. It is conjectured to have been able to swim well, and to have frequented the sea in quest of prey; its dentition shows its predatory and carnivorous character, and its remains have hitherto been met with exclusively in the chalk formations. Besides the specimens from St. Peter's Mount, Maestricht, of which the above-described skull, No. 316, is the most remarkable, fossil bones and teeth of the Mosasaurus have been found in the chalk of Kent, and, as shown by the following specimens, in the green-sand—a member of the cretaceous series—in New Jersey, United States of America. No animal like the Mosasaurus is now known to exist.

From the upper cretaceous beds of the St. Peter's Mount, Maestricht.
Hunterian.

320. A coloured plaster cast of the basioccipital bone of the *Mosasaurus Maximiliani,* Goldfuss.

The lacertian affinities of the Mosasaurus are well illustrated by this bone: it presents, as in other Sauria, a convexity towards the atlas, but sends downwards from its under surface two diverging hypapophyses—a character met with in the Lacertians and not in the Crocodilians.

The original is from the Green-sand formations of New Jersey, North America. *Presented by Prof. Henry Rogers.*

321. An anterior caudal vertebra of the *Mosasaurus Maximiliani,* nearly corresponding in position with the vertebra of the *Mos. Hoffmanni,* from Maestricht, figured by Cuvier, at A. B. fig. 6. pl. 19. 'Ossemens Fossiles,' 4to. tom. v. pt. 2, which shows the first rudiments of the hypapophyses or inferior

tubercles, to which, in the caudal series of the Mosasaurus, the hæmal arches were attached and usually anchylosed. These tubercles arise near the convex or posterior end of the centrum, from its broad, flat, under surface, on a level with the parapophyses, which are extended outwards. In the present vertebra of the *Mosasaurus Maximiliani*, this flat surface is broader in proportion to its length than in the vertebra of *Mos. Hoffmanni*, figured by Cuvier. The base of the parapophysis commences half an inch behind the border of the concave end of the centrum, but is not continued to that border, as in the vertebra compared. The present vertebra of *Mos. Maximiliani* has a relatively less antero-posterior extent. The degree of concavity and convexity of the smooth and polished articular ends is the same as in the *Mos. Hoffmanni*, but the contour of those surfaces is different, being, in *Mos. Maximiliani*, broader transversely than vertically, and the triangle is more nearly equilateral. As, however, the caudal vertebra with two inferior processes (*hypapophyses*) figured by Cuvier, *loc. cit.* pl. 19. fig. 5, shows the same general proportion of superior height to breadth of the centrum, as is shown in pl. 19. fig. 6, the difference as presented by the vertebra here described must be regarded as specific.

The following are the dimensions of this vertebra :—

	inches.
Length	3
Breadth of concave end	3
Height (imperfect) . . . . . about	3
Diameter behind parapophyses	3
Length of base of parapophysis	2
Greatest vertical diameter	$3\frac{1}{4}$

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

322. A similar caudal vertebra of, apparently the same individual, *Mosasaurus Maximiliani.*

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

323. A caudal vertebra of apparently the same *Mosasaurus*, in which the transverse diameter of the centrum begins to decrease.

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

324. The centrum of a posterior caudal vertebra of apparently the same *Mosasaurus*, in which the hypapophyses, or articular tubercles for the hæmal arch, have ceased to be developed.

This vertebra is shorter in proportion to its length, and broader in proportion to its height, than the foregoing ones, Nos. 321–323. The neurapophyses arise from nearly the whole longitudinal extent of the upper surface of the centrum: the neural canal is reduced to about half an inch in diameter.

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

325. A tooth from the left ramus of the lower jaw of the *Mosasaurus Maximiliani.*

The length of the enamelled crown is one and a half inch, but the tip is broken off: the length of the coarse osseous root is two and a half inches. The whole tooth is slightly bent, and on the concave side of the root is a smooth, elliptical depression, indicating the absorbent action excited by a successional tooth. The crown of the tooth is divided, as in the *Mosasaurus Hoffmanni,* by two ridges into an inner, more convex, and an outer, less convex side; the latter is subdivided by feeble longitudinal ridges or angles into five facets: the inner side is similarly divided into nine facets: these give the specific character of the *Mosasaurus Maximiliani.* There are no such ridges or divisions on the enamelled crown of the tooth of the *Mosasaurus Hoffmanni*; which otherwise corresponds in size and general form with that of the present species.

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

326. The enamelled crown of a similar tooth with the summit nearly entire; and a fractured crown of a corresponding tooth of the *Mosasaurus Maximiliani.*

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

327. A coloured plaster cast of the crown of a tooth of the *Mosasaurus Maximiliani.*

The original was found in the Green-sand formation at the Delaware and Chesapeake Canal, North America. *Presented by Dr. Richard Harlan.*

Genus *Macrosaurus**.

328. The centrum, with the anchylosed bases of the neural arch, of the *Macrosaurus lævis*, showing the same degree of concavity of the anterior and convexity of the posterior articular ends as in the vertebræ of the Mosasaurus, which are much less deeply capped than in the procœlian Crocodiles: the contour of the articular extremities is a wide oval, with the large end downwards; the under surface of the centrum is convex from side to side, and very slightly concave lengthwise. The fractured bases of the parapophyses show them to have been thick and trihedral, with the base turned forwards and adjoining the anterior articular concavity, the apex turned backwards and extending as far as the middle of the centrum; the bases of the neurapophyses rest upon the two anterior thirds of the upper part of the centrum; there is an indication of zygapophyses upon their fore part: the neural canal is two-thirds of an inch in diameter. The suture between the neural arch and the centrum is obliterated. There is no trace of hypapophyses, or of articular surfaces for a hæmal arch. The neural canal appears to be too wide for the terminal vertebræ of the tail after hæmapophyses have ceased to be developed. This vertebra must be regarded, therefore, either as a lumbar one, or an anterior dorsal, or cervical vertebra. Viewed as a lumbar vertebra, it differs from those of the true Crocodilians in the presence of the parapophysis from the side of the centrum; and it differs from those of the Mosasaurus in the indication of the diapophysis from the neural arch; as well as by the great difference in its general shape and proportions. It differs from the anterior dorsal and cervical vertebræ of the Mosasaurus in the absence of the inferior process or hypapophysis, in which respect it agrees with the posterior dorsals of the Mosasaurus; but it differs so much in the proportions of its breadth and height as compared with its length, as to render it very improbable that it can have belonged to a younger individual of the same species as the *Mosasaurus Maximiliani*, to which the vertebræ Nos. 321 to 324, and basioccipital bone, No. 320, above described, have been referred.

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* From the Greek *μακρὸς long, σαῦρος a lizard*; in reference to the length of the body, as indicated by the length of the bodies of the vertebræ.

The following are the dimensions of the vertebra :—

	inches.
Length	3
Breadth of anterior or concave end	2
Height of anterior or concave end	$2\frac{1}{2}$
Diameter behind the parapophyses	$2\frac{1}{2}$
Length of the base of the parapophysis	$1\frac{1}{2}$
The greatest vertical diameter of the parapophysis	2
Length of the neural arch	2

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

329. A somewhat fractured centrum of the *Macrosaurus lævis,* which in the proportions of its length to its breadth corresponds with the preceding vertebra, but is of minor relative height. The parapophysis has come off from the same relative position and extent, as regards the length of the vertebra, but much nearer the base of the neurapophysis. The neural tract presents two longitudinal grooves divided by a narrow flattened intermediate bar of bone.

The following are the dimensions of this vertebra :—

	inches.
Length	3
Breadth behind the parapophyses	$1\frac{3}{4}$
Breadth of the posterior or convex end	$1\frac{1}{2}$
Depth of the posterior or convex end (which is the deepest part of the vertebra)	$1\frac{1}{4}$
Length of the base of the parapophysis	2

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

330. The posterior part of a mutilated centrum of the *Macrosaurus lævis.* The vertical diameter is still more diminished in proportion to the transverse diameter, presenting a form of the articular ball at the back part, quite distinct from any of those in the vertebral column of the *Mosasaurus.* The under part of the posterior half of the vertebra, which is continued as far as the base of one of the parapophyses, shows no trace of process or articular surface for a hæmal arch; which circumstance, with the depressed form of the centrum, argues its position to be rather at the anterior than at the posterior extreme of the vertebral column.

Its dimensions give in the

	inch.
Breadth of the convex end	$1\frac{1}{2}$
Depth of the convex end	$0\frac{3}{4}$

From the Green-sand formations of New Jersey, North America.

Presented by Prof. Henry Rogers.

The following specimens, from 331 to 386 inclusive, were discovered in 1854 by Joseph Millard Orpen, Esq., Government Surveyor of the Cape of Good Hope, by Richard John N. Orpen, Esq., and Charles Sirr Orpen, Esq., in the Drakenberg range of mountains near Harrismith, in the Colony of the Cape of Good Hope, South Africa: they are from a secondary formation, probably of the age of the New Red Sandstone in Europe, and were presented to the College by Charles Edward Herbert Orpen, M.D., F.R.C.S., of Colesberg, Cape of Good Hope. These fossils indicate three or more genera or species of large extinct carnivorous Reptiles, combining, in their vertebræ and bones of the extremities, both crocodilian and lacertian characters, with an indication of a structure of the sacrum like that in the Dinosauria. Their precise place in the Reptilian class cannot be determined until the cranial and dental characters are known.

Genus *Massospondylus**.

331. A vertebra, probably from the tail, of the *Massospondylus carinatus.* It is remarkable for its length, which is five inches six lines; the length of the centrum is four inches three lines; the breadth of its expanded extremity being under two inches. Both the articular extremities are concave; the centrum is compressed at the middle and is carinate beneath, the keel being most produced near its anterior termination. The neural arch is anchylosed, or has been fossilized, preserving its connexion with the centrum: it gives off a little in advance of the middle of its base a short depressed obtuse diapophysis. Both anterior and posterior zygapophyses project beyond the corresponding ends of the centrum; the articular surface of the anterior one looks upwards and a little inwards; from its extremity to the fore part of the base of the spine is two inches three lines. The antero-posterior extent of the spine is two inches; its height is about one inch; it is three lines in

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* From the Greek *μάσσων longer,* and *σπόνδυλος vertebra*; because the vertebræ are proportionally longer than those of the extinct Crocodile called *Macrospondylus.*

thickness, and its summit is rounded. There is a deep fossa at both the fore and back part of its base. The length of the neural arch is five inches six lines. The neural canal does not exceed six lines in diameter at its outlet.

332. A mutilated summit of the neural arch of apparently a more posterior caudal vertebra of the *Massospondylus carinatus*. The zygapophyses are less produced. The base of the spine is more extended, but it is thinner and much lower as compared with No. 331. The under part of this fragment is grooved by the neural canal, which is four lines in diameter and slightly expands at the outlets. The length of this fragment is five inches ; its greatest breadth, at the base of the anterior zygapophyses, is one inch eight lines.

333. The hinder half of apparently a caudal vertebra of the *Massospondylus carinatus*. It shows a longitudinal ridge whence the line of suture of the neurapophyses probably extended. The centrum shows a shallow longitudinal channel below this ridge. The degree of concavity is well seen at its articular end. The left posterior zygapophysis is preserved, showing the form and aspect of its articular surface.

334. The articular end of the centrum of a vertebra of the *Massospondylus carinatus*, showing the degree of compression of the body as it recedes from the articular surface and the inferior carina.

335. A somewhat mutilated centrum of probably a caudal vertebra of the *Massospondylus carinatus*. It shows the same concavity at both ends, the same median compression and inferior ridge as in No. 331. The length of this centrum does not exceed three and a half inches.

336. The body, with the base of the neural arch, of probably a lumbar or posterior dorsal vertebra of the *Massospondylus carinatus*? The centrum shows the same median compression as in No. 331, but is not carinate below, nor are the articular extremities so concave. Some traces of a neurapophysial suture remain. The length of this centrum is barely three inches.

337. A similar but rather smaller centrum of probably a posterior dorsal or lumbar vertebra of the *Massospondylus carinatus*?

Genus *Pachyspondylus**.

338. The centrum and part of the anchylosed neural arch of a caudal vertebra of the *Pachyspondylus Orpenii.* The length of the centrum is two inches six lines; the vertical diameter of the articular end is the same. It is compressed at the middle, but not carinate below. There is a well-marked hæmapophysial surface beneath the hinder end. A strong ridge on the outside of the neurapophysis ascends, inclining backwards to the base of the diapophysis. The neurapophysis rests on the anterior three-fourths of the centrum.

339. The centrum of a caudal vertebra of the *Pachyspondylus Orpenii.* The left neurapophysis remains attached, but with evident traces of the suture: the sutural surface for the right neurapophysis is exposed. The anterior articular surface of the centrum is pretty deeply concave; the posterior surface appears to have been less concave, and to have been continued upon a hæmapophysial surface beneath. The length of this centrum is one inch nine lines; the vertical diameter of the articular end is two inches three lines; its transverse diameter is two inches.

340. A mutilated centrum, with the base of the right neurapophysis, of a caudal vertebra of the *Pachyspondylus Orpenii.* It shows the deep anterior articular concavity and the shallow posterior one continued into the single hæmapophysial surface. The base of a short depressed diapophysis is shown on the right side.

341. A somewhat mutilated centrum, with the bases of both neurapophyses, of a caudal vertebra of the *Pachyspondylus Orpenii.* It shows the same modifications of the articular extremities as in Nos. 339 and 340. The traces of the neurapophysial sutures are distinct. The neurapophyses are thick. The neural canal expands at both ends.

342. The centrum and base of the neural arch of a smaller and hinder caudal vertebra of the *Pachyspondylus Orpenii.*

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* From the Greek παχὺs *thick*, and σπόνδυλοs *a vertebra.*

343. A mutilated posterior caudal vertebra of the *Pachyspondylus*? It shows a single well-marked hæmapophysial surface below the posterior end, and an anchylosed depressed neural arch, apparently without a spine, and with both zygapophyses and diapophyses broken off.

344. A caudal vertebra of the *Pachyspondylus*? It shows a slightly divided hæmapophysial surface below one end, and a single hæmapophysial surface below the other end of the centrum. It has an anchylosed depressed neural arch, showing the base of one of the diapophyses.

345. The centrum and neural arch of a posterior dorsal or lumbar vertebra of the *Pachyspondylus Orpenii*. Both the articular ends of the centrum are subconcave.

346. The centrum of apparently a posterior sacral vertebra of the *Pachyspondylus Orpenii*. The anterior articular surface is rough and flat, on each side of which is a broad oblique sutural surface, coextensive with the depth of the centrum for the articulation of neurapophyses, having the same extent and relative position as in the Dinosauria; the nerve has escaped over the posterior third of this centrum, which is free. The under surface is convex transversely, slightly concave longitudinally; the posterior articular surface is slightly concave.

Genus *Leptospondylus*[*].

347. The centrum of a caudal vertebra of the *Leptospondylus Capensis*. The anterior surface is moderately concave, the posterior one less concave, and continued below into a single hæmapophysial surface. The length of this centrum is two inches two lines; the depth of the anterior articular end is two inches; its breadth is one inch nine lines. These proportions indicate a species, and probably a genus of reptile distinct from the foregoing.

348. The centrum and anchylosed bases of the neurapophyses of a posterior caudal vertebra of the *Leptospondylus Capensis*. In its general characters this vertebra resembles No. 347, but it is more compressed, and is shorter in proportion to its depth.

[*] From the Greek λεπτὸς *slender*, and σπόνδυλος *a vertebra*.

The following bones of the extremities can only be referred, with a degree of probability, from characters of size, proportion, and mineral condition, to the genera indicated by the above-described vertebræ.

349. The lower end of the left scapula of probably the *Massospondylus.* It shows the two surfaces for the coracoid and humerus, and the base of a process which has extended forwards from the anterior margin a little way above those surfaces, whence the body of the scapula has extended upwards in the form of a narrow compressed plate of bone having a narrow elliptical transverse section.

350. The upper end of apparently the same scapula of the *Massospondylus,* where it has become a little broader and thinner.

351. The lower end of the left scapula of a smaller individual or species of reptile, probably of the *Pachyspondylus.*

It retains a larger proportion of the base of the anterior process. The humeral and coracoid surfaces are better defined.

352. The articular extremity of a bone to which the nearest resemblance is shown in the scapular end of the right coracoid of a Crocodile: it is probably from the *Massospondylus.* It presents the same elongated rough articular facet for the scapula, and the broader, shorter and smoother surface answering to that for the humerus. The bone rapidly contracts beyond these parts to the base of the shaft, which is comparatively slender and is flattened.

353. The scapular end of the coracoid of a smaller individual or species of reptile, probably of the *Pachyspondylus*? The characters of the preceding specimen are repeated, but are more perfectly shown in the present fossil. The angular termination of the articular process for the humerus is preserved, and the deep and wide concavity between that surface and the shaft of the bone is well shown. In both the above specimens this concavity or notch appears to take the place of the foramen in the coracoid of the Crocodile for the passage of certain vessels and nerves.

354. The proximal end of one of the bones of the extremities of apparently the humerus of the *Massospondylus*? It presents a remarkably expanded and compressed shape. The head of the bone is a narrow longitudinal convexity, produced, as it seems, by the thickening of the margin of the plate, which

from this part is extended forwards, decreasing in thickness, and then bends outwards to form what answers to a deltoid process. Below this the shaft of the bone has been continued of a trihedral shape, the fracture at which part exposes a moderately large medullary cavity filled by crystalline spar.

This specimen most resembles the head of the humerus of a Monitor (*Varanus*), but differs in its being more compressed and more dilated.

355. A portion of the shaft of a long bone, which, in its trihedral shape and the relative size of the medullary cavity, resembles the beginning of the shaft of the foregoing specimen.

356. The distal end of a long bone remarkable for its expansion and compression. The fracture of the end of the shaft shows the termination of the medullary cavity. The fore part of this bone is nearly flat; its under part expands into a pair of convex condyles, which project slightly backwards; a ridge is continued above the innermost of these; it is probably the end of the same bone as No. 354.

357. The expanded and subcompressed proximal end of a bone, humerus?, corresponding with No. 354, but of smaller size, probably of the *Pachyspondylus.*

358. An iliac bone, apparently the left, of the *Massospondylus*? Its upper part is extended antero-posteriorly, terminating in a short obtuse process from the fore part of the acetabulum, and in a thicker obtuse process at the back part. The inferior thicker and more contracted part of the bone has formed the upper portion of the acetabulum. Its fore part has been broken away. In its general form and proportions this bone most resembles the iliac bone of the Iguanodon.

359. The body of the left ischium, probably of the *Massospondylus.*

360. The proximal head of a long bone, apparently a right femur, of the *Massospondylus*? The head is oblong and slightly produced inwards; a fissure appears to have divided it from the great trochanter which has been broken off.

361. The distal extremity of apparently the same femur of the *Massospondylus.* The shaft presents a full elliptical transverse section, and gradually expands to the distal end, which developes two condyles projecting backwards: the inner one

is compressed and produced at its back part. The depression between the two is very shallow anteriorly, but is very deep and narrow behind; there is no trace of a rotular surface.

362. The distal half of the left femur, apparently, of the same *Massospondylus.* It shows the entire shaft of the femur to have been slightly bent backwards.

363. The proximal portion of a right tibia of, apparently, the same *Massospondylus.* The condyloid divisions of the almost flattened head of the bone project slightly backwards: the rotular process is thick, obtuse, and rises a little above the level of the articular surface of the bone. The shaft of the bone presents a full elliptical transverse section, and shows a moderately-sized medullary cavity.

364. The distal portion of a tibia of, apparently, the same *Massospondylus.* The medullary cavity and concentric lamellæ of the compact wall of the bone are well shown. The shaft has a trihedral transverse section with the angles rounded off at the place of fracture, whence it gradually expands, and chiefly transversely, to the distal end. The articular surface is worn away, but has been indented by a groove.

365. The proximal end of a left tibia of smaller size. It differs, like the foregoing, from that of the Crocodile in having the rotular edge more produced.

366. A tarsal bone of the *Pachyspondylus*? It corresponds best in shape with the right calcaneal bone of the Crocodile; but the expanded extremities are more uniformly convex.

367. The proximal end of a metatarsal bone of the *Pachyspondylus*? The articular extremity presents an elongated-subquadrate form with the angles produced. The shaft exhibits a small medullary cavity.

368. The distal end of a similar-sized metatarsal bone of the *Pachyspondylus*? It presents a convex, slightly trochlear articular end like that in the Crocodile.

369. The proximal end of another somewhat smaller metatarsal bone of a similar character to the preceding, but it has been crushed (*Pachyspondylus*?).

370. The proximal end of a somewhat smaller metatarsal bone, with the same character of articular surface as in No. 367 (*Pachyspondylus* ?).

371. The somewhat mutilated distal end of a metatarsal bone (*Pachyspondylus* ?).

372. A mutilated distal end of a metatarsal bone (*Pachyspondylus* ?).

373. A water-worn distal end of a metatarsal bone (*Pachyspondylus* ?).

374. A singularly-formed, short and broad metatarsal bone of the *Pachyspondylus* ? It most resembles in its proportions the fifth or outermost in the Lizard tribe. At its proximal end it presents a somewhat flattened subtriangular articular surface for the tarsus, and a narrow articular facet on one side at right angles with the base of the triangle, for an adjoining metatarsal. The shaft of the bone is broader than it is long; it is flattened from before backwards, and is slightly twisted. It terminates in a pair of transversely extended convex condyles, continued into each other by an oblique shallow trochlear groove.

375. A proximal phalanx of the *Pachyspondylus* ? It is short, broad, subcompressed from before backwards, with a slightly concave proximal end, and the trochlear distal end resembles that in the Crocodile.

376. A proximal phalanx of the *Pachyspondylus* ? It is short, but thicker than the preceding; a sesamoid bone remains *in situ* attached by the matrix behind the distal condyles.

377. A proximal phalanx of the *Pachyspondylus* ? The distal condyles are broader and more compressed antero-posteriorly than in the preceding specimen.

378. A proximal phalanx of the *Pachyspondylus* ? It is shorter, but similar in its proportions to the preceding.

379. A middle phalanx of the *Pachyspondylus* ? It is thick and strong in proportion to its length.

380. A middle phalanx of the *Pachyspondylus* ? The two trochlear concavities are

better marked, and the distal convexities unequal in size, and forming an oblique trochlea. This bone is shorter in proportion to its thickness than the foregoing.

381. The distal end of a middle phalanx of the *Pachyspondylus*? It shows a well-marked and peculiar trochlear articulation. The convex curve of the condyles describes three-fourths of an ellipse. The dividing channel is wide, deep, and almost angular below, narrower above; the whole surface expanding as it descends and bends backwards.

382. An ungual phalanx of the *Pachyspondylus*? The surface is modified to be adapted to the distal surface of the preceding or a similar phalanx. The body of this bone is subcompressed, curved downwards, impressed on each side by the groove for the vessels of the claw, and more convex on the one side than the other: the point is broken off.

383. A similarly shaped ungual phalanx of the *Pachyspondylus*? Its base is more extended vertically. It seems also to have been narrower transversely, but the specimen has been crushed and somewhat mutilated.

384. A mutilated ungual phalanx of the *Pachyspondylus*? It is similar in its general shape and curvature to the preceding, but is a little broader at its upper and back part.

These phalanges must have supported compressed, curved and sharp-pointed talons almost twice the size of those of the largest existing Lion or Tiger. All the bones of the foot, here preserved, indicate a paw of much greater breadth and strength, and more formidably provided with weapons for prehension and laceration, than in any known existing Crocodile or Lizard. The form of ungual phalanx to which the above-described specimens, Nos. 382–384, most nearly approach, is that fossil one from European oolitic strata which has been assigned to the *Megalosaurus*.

385. A smaller ungual phalanx of the *Leptospondylus*? It is deeper at its base, is more compressed and more curved and pointed than are any of the ungual phalanges of a large crocodile with which it corresponds in size. In its shape it resembles more the ungual phalanges in the great carnivorous Monitor (*Varanus*).

386. A fragment of a symmetrical pair of bones, each of a subtrihedral form, and united by the flattest of their sides. In the fragment here preserved, which is two and a half inches in length, each bone increases in vertical, and decreases, but in a less degree, in transverse extent, the bones becoming more closely and more extensively united together, as they extend forwards. Posteriorly, each bone is grooved near the middle of its inner flattened side, the grooves, when co-adapted, forming a canal, answering to that in a similar position on the elongated symphysial part of the lower jaw of the Gavial. At the opposite end of the fragment this canal is reduced to a fissure. The groove which divides the two bones, both above and below, at the back part of the fragment, contracts to a linear fissure as the bones advance and become more united together. The result of an extensive series of comparisons is, that the symmetrical bones in this remarkable fossil most resemble in shape the co-adapted, elongated dentary elements of the lower jaw of the Gavial and Teleosaurus; but they show no traces of alveoli, and if they be parts of those bones, they indicate a reptile either edentulous, or with the teeth confined to the anterior extremity of the jaw: the latter is least likely, by reason of the almost total obliteration of the nervo-vascular dental canal. The compact concentrically laminated outer wall is three lines thick at the outer angle of the hinder ends of the fragments, but is diminished to one and a half line at their fore part; the rest of the substance is occupied by a cancellous disposition of the osseous matter, becoming more open as it approaches the centre.

A section of the symphysis of the lower jaw of a Gavial is placed with the fossil.

Order OPHIDIA.

(Serpents, Slow-worms: the body vermiform, apodal, scaled: the vertebræ procœlian, with complex articular processes, called zygosphene, zygantra and zygapophyses.)

Genus *Palæophis*[*].

387. A group of about thirty vertebræ, with several of the long and slender ribs,

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[*] From the Greek παλαιὸς *old*, and ὄφις *serpent*.

cemented together by the petrified clay, of the Sheppey constricting serpent (*Palæophis toliapicus*).

From the eocene tertiary formation of the Isle of Sheppey, Kent.

Hunterian.

388. A nodule of petrified clay, with a series of nine vertebræ of the *Palæophis toliapicus.*

From the eocene tertiary formation of the Isle of Sheppey, Kent.

Hunterian.

389. Three mutilated vertebræ, in natural juxtaposition, of the *Palæophis toliapicus.*

From the eocene tertiary formation of the Isle of Sheppey, Kent.

Hunterian.

390. Four vertebræ and half of a fifth, in natural sequence, but slightly dislocated, of the *Palæophis toliapicus.* These show well the vertebral characteristics of this extinct genus and species of large constricting serpent.

From the eocene tertiary formation of the Isle of Sheppey, Kent.

Hunterian.

391. Three vertebræ, in natural juxtaposition, of the *Palæophis toliapicus.* The convex costal surfaces of the parapophyses and the neural spines are well preserved in this specimen.

The fossil Ophidian vertebræ which have been discovered in the London clay at Sheppey are, for the most part, smaller than those, Nos. 392–402, from Bracklesham; they are nevertheless equal to those of a *Boa constrictor* of from ten to twelve feet in length. They all repeat, however, the generic modifications characteristic of *Palæophis*; the hinder margin of the neurapophyses is produced into a pointed or angular plate; the articular prominence for the rib is wholly convex; the zygapophyses are short, and no diapophysial point extends beyond the anterior ones; the height of the neural spine exceeds its antero-posterior extent. The veritable Ophidian character of the Reptile to which these fossil vertebræ belonged, is not only shown by their individual structure, but is well illustrated by the number of them in natural articulation which have occasionally been found cemented together in the petrified clay, as *e. g.* in the specimen No. 387.

As compared with either of the species of *Palæophis* from Bracklesham, the vertebræ from Sheppey have the centrum proportionally longer and more slender, with a smaller terminal cup and ball. The hypapophysial ridge is more constant and better marked; it is produced at both extremities, and most so at the hinder one, but here in a less degree than in the *Palæophis typhæus*: the neural arch is less suddenly compressed above, or inclines more gradually to the base of the spine; this spine also, although its base is extended to near the anterior border of the zygosphene, appears to be higher in proportion to its antero-posterior extent than in the *Palæophis typhæus*.

From the eocene tertiary formation of the Isle of Sheppey, Kent.

Presented by Prof. Owen, F.R.S.

392. Two somewhat mutilated vertebræ of the *Palæophis typhæus*, preserved as naturally co-articulated, and showing the reception of the posterior zygapophysis of the anterior vertebra into the cavity between the zygosphene and the true zygapophysis beneath, of the posterior vertebra. The zygantral surface on the inner side of the posterior zygapophysis of this vertebra is well shown.

This specimen is figured in the 'Monograph on the Reptiles of the London Clay,' published by the Palæontographical Society, pl. 3. fig. 28.

From the eocene formations of Bracklesham.

Presented by Frederick Dixon, Esq., F.G.S.

393. A slab of eocene clay, in which is imbedded an almost entire vertebra of the *Palæophis typhæus*, exposing the zygantral surface of the neural arch, and the articular ball at the back of the centrum. About one inch of the neural spine is preserved, showing the characteristic difference in the length of this process between the Palæophis and the large modern constricting serpents. The inferior spine or 'hypapophysis' is well preserved. A vertebra, from a large African Constrictor (*Python Sebæ*) of twenty feet in length, is placed with the fossil to illustrate its nature.

From the eocene formations of Bracklesham.

Presented by Prof. Owen, F.R.S.

394. Five more or less mutilated vertebræ of the *Palæophis typhæus*.

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

395. Two vertebræ, somewhat mutilated, of the *Palæophis typhæus.*

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

396. Two vertebræ, somewhat mutilated, of the *Palæophis typhæus.*

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by George Coombe, Esq.

397. A mutilated vertebra of the *Palæophis typhæus*: it indicates a serpent of about twenty feet in length.

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by Prof. Owen, F.R.S.

398. A somewhat mutilated vertebra of the *Palæophis typhæus.* It shows a well-marked hypapophysis, and indicates a serpent of about twenty-five feet in length.

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

399. The centrum of a vertebra of the *Palæophis typhæus.*

The diapophyses or costal tubercles are unusually well preserved. The anterior hypapophysis has been broken off.

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by Prof. Owen, F.R.S.

400. A vertebra, wanting the neural spine and costal tubercles, of the *Palæophis typhæus.* It shows well the hypapophysis.

From the eocene tertiary formation of Bracklesham, Sussex.

Presented by the Marchioness of Hastings.

401. A mutilated centrum of a vertebra of the *Palæophis typhæus.*

From the eocene tertiary formation at Bracklesham, Sussex.

Presented by the Very Rev. Dr. Buckland, F.R.S.

402. A vertebra, wanting the neural spine, of the *Palæophis porcatus.*

This is chiefly distinguished by the ridge which extends from the anterior to the posterior zygapophysis. There are two hypapophyses.

From the eocene formation at Bracklesham, Sussex.

Presented by George Coombe, Esq.

The true Ophidian nature of the rare and remarkable fossils above-specified is demonstrated, not only by the superadded zygosphenal and zygantral articulations, but by the solidity of the zygosphene, by the size and form of the centrum, by those of its articular cup and ball and of its hypapophysis, and also by the size and prominence of the diapophysis. The largest vertebræ, Nos. 392, 393, 397, 398, probably from about the middle of the body, as compared with the vertebræ from the same part of the skeleton of a *Python Sebæ* twenty feet in length, are longer in proportion to their breadth, and the cup and ball of the centrum are larger; the hypapophysis is more produced, and there is a second smaller hypapophysis close to the anterior part of the under surface of the centrum, which in most of the large vertebræ is connected by a ridge with the hinder and normal hypapophysis; but in a few vertebræ it is not so connected. The articular cup and ball are less obliquely placed upon the extremities of the centrum, being nearly vertical. The rim of the cup is sharply defined, and is more produced from between the bases of the diapophyses; a deeper and narrower chink intervening than in the *Python*. The transverse diameter of the cup is greater than that of the zygosphene—a proportion which is not found in the vertebræ of any existing genus of Serpent, in which the base of the zygosphene always equals at least the parallel diameter of the articular cup. The articular part of the diapophysis is more produced outwards and less extended vertically in *Palæophis* than in *Python*, and it is uniformly convex; a ridge is continued from its upper end obliquely forwards to, but not beyond, the apex of the anterior zygapophysis, forming the angle between the lateral and anterior surfaces, whilst the horizontal articular facet forms the third surface of that three-sided conical process. In the *Python* the non-articular part of the same zygapophysis is convex, and the process is much more extended outwardly; the proportions of the zygapophysis in the *Palæophis* more resemble those in the *Coluber* and *Hydrus*, but differ from these, as also from *Naja* and *Crotalus*, in the non-extension of the diapophysial point beyond the articular surface.

A ridge or horizontal rising of the bone extends from the anterior to the posterior zygapophysis in the *Palæophis porcatus*, but is more or less blunted or subsides midway in the *Pal. typhæus*, and is by no means so produced outwards as in *Python*; in this respect more resembling that in *Coluber* and *Hydrus*. Below the middle of this ridge, on a level with the upper surface of the centrum, there is a short, nearly parallel rising in *Palæophis*. The zygosphene is slightly excavated anteriorly, and shows no trace of the tubercle which characterizes the middle of that surface in the *Python*; it is also broader in proportion to its height. But perhaps the most characteristic feature of the vertebra of the *Palæophis* is the peculiar production of the posterior border of the neurapophysis into an angle directed upwards, outwards and backwards, and this is common to all the species; there is no trace of this process in the *Hydrus,* and the nearest approach to it among existing Serpents is a low, tuberous angle at the corresponding part of the vertebra of the *Eryx.* The posterior zygapophysis resembles the anterior one in its much less extent, especially transversely, as compared with that in the *Python,* and the posterior border of the neurapophysis rises from its apex vertically, or a little inclined outwards and backwards, giving a squarish form to the surface of the neural arch in which the zygantra are excavated; these cavities, in proportion to the articular ball beneath, are smaller and less deep than in the *Python,* or any other existing genus of Serpent. The sloping sides of the neural arch above the zygapophysial ridge are more concave than in *Python,* and so resemble those parts in *Coluber* and *Hydrus.* The latter genus and *Crotalus* most resemble *Palæophis* in the proportions of the neural spine; this part, however, in *Palæophis* differs from that of *Hydrus* in having its base coextensive with the supporting arch, springing up from the fore part of the zygosphene, whilst the arch projects forwards, clear of the base of the spine, in *Hydrus,* as in *Python, Coluber,* and *Naja*; but in *Crotalus* the base of the spine has the same anteroposterior extent as in *Palæophis,* and it comes very near to the fore part of the zygosphene in *Eryx.*

Prior to the description of the vertebræ of the *Palæophis* in the 'Geological Transactions' for 1839 (vol. vi. 2nd series, p. 209), the sole notice of any fossil belonging to the order of Serpents was contained in the following passage from the Appendix to the concluding volume of Baron Cuvier's 'Recherches sur les Ossemens Fossiles.' After alluding to the scarcity of the fossil remains of birds, Cuvier proceeds to say:—" The bones of serpents are still rarer, if it be possible. I have seen no specimens of them, save the vertebræ from the osseous breccia of Cette, and a single one from the freshwater deposits of the Isle of Sheppey *."

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* " Les os de serpens sont encore plus rares, s'il est possible. Je n'en ai vu que des vertèbres des brèches osseuses de Cette, dont j'ai parlé à l'article de ces brèches, et une seule des terrains d'eau douce de l'île de Sheppey." (Tom. v. pt. ii. p. 526, 1824.)

Order BATRACHIA.

(Newts, Salamanders, Frogs, Toads : the body naked : the skull joined to the vertebral column by two condyles : ribs short or absent : respiration by gills in the young and by lungs in the adult : some, called *Perennibranchiata,* retain through life more or less of the branchial apparatus with the branchial apertures.)

Genus *Labyrinthodon**.

403. A coloured plaster cast of the entire skull of the *Labyrinthodon Salamandroïdes* (*Mastodonsaurus* of Jaeger).

The Batrachian affinities of this huge reptile are manifested by the two condyles developed from the exoccipitals; by the vomerine teeth; by the broad and very depressed shape of the skull; by the small, distinct, and separated nostrils, and by the wide and deep grooves for the large mucous ducts: its Crocodilian affinities are manifested by the connection of the maxillary with the tympanic bone, through the medium of malar and squamosal bones; by the produced angle and the general form of the lower jaw; and by the external sculpturing of the cranial bones.

The structure of the teeth of this animal is peculiar and distinct from that of any other known reptile, and most resembles that of the teeth of some extinct salamandroid fishes (*Rhizodus*).

The original is from the Keuper Sandstone ("Lettenkohle" division) of Gaildorf, in Wirtemberg, and is preserved in the Royal Museum of Natural History at Stuttgart: it is figured in the work by Hermann von Meyer and Dr. Plieninger, entitled "Beiträge zur Paläontologie Württemberg's, mit besonderer Rücksicht auf die Labyrinthodonten des Keupers." Folio. 1844. Taf. vi. & vii. *Presented by Prof. Jaeger.*

404. A section of one of the large or canine teeth of the *Labyrinthodon Salamandroïdes.*
It is cemented to a slide of glass, and when viewed by a moderate magni-

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* From the Greek λαβύρινθος *a labyrinth,* ὀδοὺς *a tooth,* in reference to the complex interblending of the different tissues of the tooth in this genus of Batrachian reptile.

fying power with transmitted light, the peculiar structure may be seen, of which the following is a brief description :—

The tooth appears to be of the simple conical kind, with the exterior surface merely striated longitudinally, but every streak is a fissure into which the very thin external layer of cement is reflected into the body of the tooth, following the sinuous wavings of the lobes of dentine which diverge from the central pulp-cavity.

The inflected fold of cement runs straight for about half a line, and then becomes wavy, the waves rapidly increasing in breadth as they recede from the periphery of the tooth; the first two, three, or four undulations are simple; then their contour itself becomes broken by smaller or secondary waves; these become stronger as the fold approaches the centre of the tooth, when it increases in thickness, and finally terminates by a slight dilatation or loop close to the pulp-cavity, from which the free margin of the inflected fold of cement is separated by an extremely thin layer of dentine.

The number of the inflected converging folds of dentine is about fifty at the middle of the crown of the tooth, but is greater at the base. All the inflected folds of cement at the base of the tooth have the same complicated disposition with increased extent; but, as they approach their termination towards the upper part of the tooth, they also gradually diminish in breadth, and consequently penetrate to a less distance into the substance of the tooth. Hence, in such a section, it will be observed that some of the convoluted folds extend near to the centre of the tooth; others reach only about half-way to the centre; and those folds, which, to use a geological expression, are "cropping out," penetrate to a very short distance into the dentine, and resemble, in their extent and simplicity, the converging folds of cement in the fangs of the tooth of the Ichthyosaurus.

The disposition of the dentine is still more complicated than that of the cement. It consists of a slender, central, conical column, excavated by a conical pulp-cavity for a certain distance from the base of the tooth; and this column sends radiating outwards, from its circumference, a series of vertical plates, which divide into two, once or twice before they terminate at the periphery of the tooth.

Each of these diverging and dichotomising plates gives off throughout its course smaller processes, which stand at right angles, or nearly so, to the main plate; they are generally opposite, but sometimes alternate; many of the secondary plates or processes, which are given off near the centre of the tooth, also divide into two before they terminate; and their contour is seen, in the transverse section, to partake of all the undulations of the folds of cement which invest the dentinal plates and processes, and divide them from each other.

The tooth from which the above-described section was taken, was from the Keuper Sandstone (' Lettenkohle' division) of Gaildorf in Wirtemberg.

Presented by Prof. Owen, F.R.S.

405. A coloured plaster cast of part of the angular element of the right ramus of the lower jaw of the *Labyrinthodon Salamandroïdes.*

The original is described and figured in Professor Owen's Memoir, " On the Genus Labyrinthodon," Geological Transactions, vol. vi., 2nd Series, pl. 47: it was discovered in the New Red Sandstone, at Guy's Cliff, Warwickshire. *Presented by the Very Rev. Dr. Buckland, F.R.S.*

406. A coloured plaster cast of a portion of the right ramus of the lower jaw of the *Labyrinthodon Salamandroïdes.*

The original is described and figured in the above-cited memoir, pl. 47, and was likewise discovered in the New Red Sandstone, at Guy's Cliff, Warwickshire. *Presented by the Very Rev. Dr. Buckland, F.R.S.*

The two preceding specimens, and the stratum in which they were found, are the subjects of the following remarks by the eminent geologists, Sir Roderick Impey Murchison, and Professor Hugh Strickland, in their Memoir on the New Red Sandstone formations of Warwickshire:—

"The light-coloured sandstone of Warwick agrees completely with the rocks of Ombersley and Bromsgrove, in rising from beneath the marls, and in passing downwards into solid red sandstone. Although this rock has been recently described by Dr. Buckland, it is essential to our purpose to state, that, from geological and other evidences, we consider that it cannot be, as he conceives, the equivalent of the German Keuper. The true position of that rock is, fortunately, indicated in natural sections near Warwick, as well as in many parts of Worcestershire, where it is demonstrated that the thin-bedded sandstone, or true Keuper, is separated from the thick-bedded sandstone of Ombersley, Bromsgrove, and Warwick, by a vast thickness of red and green marl. Obedient, however, to geological principles, based on zoological evidences, we should not pretend to set up the classification here suggested, in opposition to the views of so distinguished a geologist as Dr. Buckland, if founded only on the relative geological position of these rocks. On the contrary, if it could have been shown that the fossils which we have now pointed out as characterizing the upper sandstone, occurred also in the lower,—that the plants in the lower sandstone were similar to the well-known plants of the German Keuper,—and that the fragments of Saurians found in the sandstones of Guy's Cliff and Warwick really belonged to the species peculiar to the Keuper,—then, indeed, we should willingly allow that the lower sandstone also must be grouped with that formation. Seeing, however, that the animal remains of the one sandstone are, as far as we can judge, entirely different from those of the other, and that the plants, so abundant in the lower rock, have none of the characters of the Flora of the Keuper, but, on the contrary, contain one remarkable plant, the *Echinostachys*, a genus considered by Adolphe Brongniart as peculiarly characteristic of the *Grès bigarré*,—we are compelled to adhere to our opinion, and to contend that the peculiar sandstone of Burgehill, Ripple, Inkbarrow, Alcester, Shrawley Common, &c., which we have been the first to describe, is the true equivalent of the *Keuper Sandstein*, and that the sandstone of Ombersley, Bromsgrove, and Warwick, is not the *Keuper*, but a portion of the *Bunter Sandstein*. In respect to the Saurian of Guy's Cliff, which we have had no opportunity of examining, it is sufficient to state, that Dr. Buckland himself does not contend that it is of the same species as either of the *Phytosauri* (Jäger) of the German Keuper; and he hesitates even to refer it to that genus. Now the mere existence of a Saurian in the Warwick sandstone proves nothing; for geologists are well aware that various species of the family occur in all the formations, from the lias down to the magnesian limestone inclusive. Indeed, as these animals are not unfrequent in the Bunter Sandstein of Germany, we cannot avoid suspecting that the animal remains of Guy's Cliff may, if ever accurately determined, be assigued to some of those species, mentioned by M. Voltz and others as occurring in the Bunter Sandstein, or German deposits, which, from the other proofs adduced, we consider to be of the same age."

407. A portion of Keuper sandstone, with the crown of the tooth of a Labyrinthodont reptile.

From the New Red Sandstone of Warwickshire.

Presented by Prof. Strickland, F.G.S.

408. A cranial, probably frontal bone of a (Labyrinthodont?) reptile, exhibiting a smooth inner surface, marked with the radiating lines of growth of the bone, and a coarsely tuberculated and irregularly grooved outer surface, the grooves having a tendency to a radiating direction, as in some Crocodilians, and more especially as in the Labyrinthodont reptiles. The outer surface is dense and polished. The thickness of the bone at one end exceeds half an inch. It is upwards of five inches in length and four inches in breadth.

From the triassic deposit called "bone-bed," at Aust Passage, near Bristol. *Presented by Dr. Johnson.*

409. A plaster cast of the right iliac bone of the *Labyrinthodon pachygnathus*. It is about six inches in length, and in the acetabulum there is a combination of Crocodilian and Batrachian characters. The acetabular cavity is bounded

on its upper part by a produced and sharp ridge, as in the Frog; and not emarginate at its anterior part, as in the Crocodile. Above the acetabulum in the Frog the ilium gives off a broad and depressed process, the lower extremity of which is separated from the acetabulum by a smooth concave groove, both of which are wanting in the Crocodile, there being only a slight rising of the upper border of the acetabulum. These characters, however, are well developed in the *Labyrinthodon*; but the process, instead of being depressed, is compressed, and its internal extremity is pointed and bent forwards, representing the rudiment of the long anterior process of the ilium in the *Batrachia Anoura*; but it does not attain, in the *Labyrinthodon*, the parallel of the anterior margin of the acetabulum; and the bone terminates in a thick truncated extremity a few lines anterior to the acetabulum, which gives an essential feature of resemblance to the Crocodiles, and a proportional difference from the Batrachians. But the most marked difference in this fossil from the Crocodile, is the length of the ilium posterior to the acetabulum, in which it agrees with the analogous portion of the ilium in the Frog and other tailless Batrachians; while, on the contrary, there is an agreement with the Crocodilian type in the mode of articulation to the vertebral column. In the Frog, a transverse process of a single vertebra abuts against the anterior extremity of the produced ilium. In the Crocodile the transverse process of two vertebræ is thickened and expanded, and joined to a rough, concave, articular surface, occupying the inner side of the ilium, and a little posterior to the acetabular cavity. In the *Labyrinthodon* is a similar, well-marked, rough, elongated, concave, articular surface, divided by a non-articular surface, and destined for the reception of the external extremities of two sacral ribs. The Labyrinthodon likewise agrees with the Crocodile in the lower part of the acetabulum being completed by the upper extremity of the pubis, the anterior and inferior part of the ilium offering an obtuse process at the posterior part of the lower boundary of the acetabular cavity.

The original is from the New Red Sandstone at Coton End, near Warwick.

Presented by Dr. Lloyd.

Genus *Archegosaurus* [*].

410. The half of a split sphærosideritic nodule, containing the skull and anterior trunk-bones of the *Archegosaurus minor*, Goldfuss.

Much of the surface of the cranial bones is destroyed, but the long backwardly produced rami of the lower jaw, and the backwardly inclined tympanic pedicles, with the form and position of the completely surrounded orbits, and remains of the teeth, may be discerned. The broad, flat, rhomboid basihyal shows the radiated disposition of the bony fibres, with part of the short cerato-hyals and the long, terminally expanded hypobranchial appendages. Some of the anterior short free ribs are preserved; they are slightly expanded, and flat at both extremities, resembling the pleurapophyses of the perennibranchiate Batrachia.

The extinct animal represented by this fossil has been referred to the class of Fishes under the name of *Pygopterus*, and to the Saurian order under the name of *Archegosaurus*; but the broad, flat cranium with the divided vomer, the double occipital condyle, the persistent largely developed hyoid and branchial framework, and the short free ribs of the trunk, indicate the essential affinities of the species to be with the Batrachian order, in which they link the Labyrinthodont or Sauroid Batrachia more closely with the perennibranchiate family.

From the carboniferous formations called Steinköhlengebirge at Saarbruck, Germany. *Presented by the Earl of Enniskillen, F.R.S.*

411. A coloured plaster cast of the carboniferous shale in which is imbedded the cranium, nuchal plate, and some anterior vertebræ and ribs of the *Archegosaurus Dechenii*, Goldfuss. The form of the cranium corresponds with that of the Labyrinthodont Batrachia, and the short and straight free or floating vertebra ribs—pleurapophyses—more satisfactorily indicate the batrachian affinities of this extinct reptile.

The original is from the carboniferous formations called Steinköhlengebirge at Saarbruck. *Presented by Professor Goldfuss.*

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[*] From the Greek ἀρχηγὸς *beginning*, σαῦρος *lizard*; in reference to the antiquity of the formation in which the remains of this remarkable genus of reptiles have been found.

412. A coloured plaster cast of the skull of the *Archegosaurus Dechenii.* It shows the depressed form, circumscribed orbits, and rugous exterior surface of the bones, as in other members of the Labyrinthodont family of reptiles: the strong and fixed tympanic pedicles extend obliquely downwards and backwards for articulation with the lower jaw. The occipital and premaxillary extremities of the skull have been broken away.

The original is from the carboniferous formations called Steinköhlengebirge at Saarbruck and Lehbach. It is figured in the "Beiträge zur vorweltlichen Fauna des Steinköhlengebirges," taf. 1. fig. 1, by the

Donor, Professor Goldfuss.

413. A coloured plaster cast of part of a nodule of sphærosiderite from the carboniferous formations of Lehbach, containing an impression of about eighteen vertebræ, with some of the integument, of the *Archegosaurus Dechenii.* The pleurapophyses or vertebral ribs are short, slightly bent and expanded at both ends; the anterior ones the broadest, but all of nearly equal length, having apparently terminated freely, as in the existing Batrachia. The integument appears to have been smooth and finely wrinkled, but in the original specimen it would seem that traces of minute scales had been detected, probably like those in the mucous integument of the Siren.

The original is figured in the work above quoted, taf. 2. fig. 1; and is from the Steinköhlengebirge of Lehbach.

Presented by Professor Goldfuss.

414. A coloured plaster cast of the opposite moiety of the same sphærosideritic nodule, showing more of the character of the surface of the integument, and also the impression of a short subcompressed humerus, of the *Archegosaurus Dechenii.*

The original is figured in taf. 2. fig. 2 of the work quoted in the description of No. 412, and is from the Steinköhlengebirge of Lehbach.

Presented by Professor Goldfuss.

415. A coloured plaster cast of a sphærosideritic nodule, containing several bones, and an impression of the integument, of the *Archegosaurus Dechenii.* The bones include many of the free vertebral ribs, a humerus, radius and ulna, and some of the phalanges of four fingers; the latter have slightly expanded and flat articular extremities, indicative of ligamentous joints, as in some of the lower perennibranchiate reptiles.

The original is figured in taf. 2. fig. 3 of the work above quoted, and is from the Steinköhlengebirge of Saarbruck.

Presented by Professor Goldfuss.

416. A coloured plaster cast of part of a split sphærosideritic nodule, enclosing the skull and part of the skeleton of the trunk, and part of the integument, of the *Archegosaurus medius*. In the skull, which corresponds in general characters with that of the *A. Dechenii*, the backwardly projecting angles of the lower jaw are shown.

Impressions of a large flat rhomboid basihyal, of short ceratohyals, and of long and terminally expanded hypobranchial bones, are shown; also what appear to be scapula and coracoids; the former similar to, but rather broader than, the contiguous ribs: the coracoid is expanded at both ends, but particularly at the lower one, and notched posteriorly. Bones corresponding to the femur, tibia and fibula are shown at the hinder end of this specimen.

Very interesting remains of what appear to be tuberculated branchial arches are retained behind the head near the hyobranchial apparatus. They appear to be detached ossicles that have probably been supported by cartilaginous arches.

The original is figured in taf. 3. fig. 1 of the work above quoted, and is from the Steinköhlengebirge of Saarbruck.

Presented by Professor Goldfuss.

417. A coloured plaster cast of a moiety of a split sphærosideritic nodule, containing the skull and fore part of the bones of the trunk of the *Archegosaurus minor*. This shows the hyoid and hypobranchial bones, and some of the anterior short, free, or floating ribs.

The original is figured in taf. 3. fig. 2 of the work above quoted, and is from the Steinköhlengebirge of Lehbach, near Saarbruck.

Presented by Professor Goldfuss.

418. Coloured plaster casts of a split sphærosideritic nodule, exposing a great part of the skull and anterior trunk-bones of the *Archegosaurus minor*.

The original is from the carboniferous strata at Lehbach, near Saarbruck.

Presented by Professor Goldfuss.

Reptilia incertæ sedis.

419. Portions of petrified ribs, resembling in form those of a *Plesiosaurus*. In the Hunterian MS. Catalogue they are entered as "*m* 23, Parts of the ribs of an Alligator."

Locality unnoted. By a memorandum in the tray, "Dr. Mason's Sale, Q. 123." *Hunterian.*

420. A slab of lithographic limestone, in which is imbedded a portion of a rib of a reptile. In the Hunterian MS. Catalogue it is entered as "*o* 8, The clavicle of a Bird in limestone, Germany." The fossil resembles in shape the half of the furcular bone of a bird of prey, but it consists of a solid osseous structure, exhibiting the microscopic characters of the bone of a Saurian reptile.

From an oolitic formation in Germany. *Hunterian.*

421. A slab of lithographic limestone, in which is imbedded a portion of a rib of the same species of reptile.

From an oolitic formation in Germany. *Hunterian.*

422. A slab of lithographic limestone, in which is imbedded portions of two ribs, grooved longitudinally like those of the *Ichthyosaurus*.

From an oolitic formation at Querfurt in Saxony. *Hunterian.*

423. A slab of compact stone, like lithographic slate, containing a metacarpal or metatarsal bone of some small reptile.

From an oolitic formation at Querfurt in Saxony. *Hunterian.*

424. A slab of lithographic limestone, in which is imbedded a portion of bone, resembling the neural spine of a dorsal or lumbar vertebra of a Saurian reptile.

From an oolitic formation at Querfurt in Saxony. *Hunterian.*

425. A slab of oolitic slate, in which is imbedded a portion of bone resembling the neural spine of a dorsal or lumbar vertebra of a Saurian reptile.

From the oolitic formation at Stonesfield, Oxfordshire. *Hunterian.*

426. A fragment of bone partly imbedded in a piece of oolitic stone.
Locality unnoted. *Hunterian.*

427. A coloured plaster cast of a slab of New Red Sandstone, with the impression of the foot of a pentadactyle, unguiculate, web-footed reptile.

The original is from Shrawley Common, Warwickshire, and is thus described in the "Memoir on the Upper Formations of the New Red Sandstone System of Gloucestershire and Warwickshire," by Sir R. I. Murchison and Prof. Strickland, in the Geological Transactions for 1837, vol. v. 2nd Series :—

"Our proofs of the existence of probably a Batrachian in this rock, are similar to those which have been held sufficient to establish the claims of the sandstones of other countries to a similar distinction, viz. the impressions of the feet of animals. We found these interesting relics in the sandstone of Shrawley Common. They afford the same proofs as those which have been insisted on in the case of the footsteps of tortoises in Dumfries-shire, viz. the same inverted position of the claws, similar raised portions of sandstone behind each impression, caused by the progressive movement of the animal, and similar indentations proving the occasional halts in the march of the animal. The Warwickshire impressions are further distinguished by a depressed groove, running intermediate between the footsteps, and apparently caused by the tail of the animal dragging in the soft mud. These footsteps bear some resemblance to one of the Hildburghausen species figured in Buckland's 'Bridgewater Treatise,' plate 26‴, and supposed by Professor Owen, Mr. Broderip, and other zoologists who have examined them, to belong to some genus of crocodilian saurian." (p. 339.)

From the New Red Sandstone of Warwickshire.

Presented by Professor Hugh Strickland, F.R.S.

428. A large slab of New Red Sandstone, which presented on its under surface, as it lay *in situ*, many casts in relief of cavities which had been impressed on the argillaceous shale on which it rested, and on which it had been deposited in the condition of moist or disintegrated sand.

Most of these impressions are foot-prints of animals; some closely resembling No. 427, from the same formation in Warwickshire, others like the foot-prints of a small Terrapene or Emydian Tortoise, and a few well-marked impressions of the hind and fore foot of a large and probably Labyrinthodont Batrachian.

The hind foot of this extinct animal was, as in the Toad and Frog, much larger than the fore foot; and the innermost digit in both was short and turned in, like a thumb.

Consecutive impressions of the prints of these feet have been traced for many steps in succession in quarries of the New Red Sandstone formation in Warwickshire, Cheshire, and also in Lancashire, more especially at a quarry of a whitish quartzose sandstone at Storton Hill, a few miles from Liverpool. The foot-marks are partly concave and partly in relief; the former are seen upon the upper surface of thin beds of clay-stone, but those in relief are only upon the lower surfaces of the intervening beds of sandstone, being, in fact, natural casts, formed on the subjacent foot-prints as in moulds. The impressions of the hind foot are generally, as in the present specimens, eight inches in length and five inches in width: near each large footstep, and at a regular distance—about an inch and a half—before it, a smaller print of the fore foot, four inches long and three inches wide, occurs. The footsteps follow each other in pairs, each pair in the same line, at intervals of about fourteen inches from pair to pair. The large as well as the small steps show the thumb-like toe alternately on the right and left side, each step making a print of five toes.

Similar foot-prints were first observed in Saxony, at the village of Hessberg, near Hildburghausen, in several quarries of a gray quartzose sandstone, alternating with beds of red sandstone, and of the same geological age as the sandstones of England that had been trodden by the same strange animal. The German geologist, who first described them, proposed the name of *Cheirotherium* (Gr. *cheir*, the hand, *therion*, beast) for the great unknown animal that had left the foot-prints, in consequence of the resemblance, both of the fore and hind feet, to the impression of a human hand, and Dr. Kaup conjectured that the animal might be a large species of the opossum-kind. The discovery, however, of fossil skulls, jaws, teeth, and a few other bones in the sandstones, exhibiting the foot-prints in question of Labyrinthodont Batrachia, agreeing as to size and proportions of the fore and hind limbs with those of the foot-prints in question, has rendered it more probable that both the foot-prints and the fossils are evidences of the same kind of huge extinct batrachian reptiles.

From the New Red Sandstone of Storton Hill, Lancashire.

Presented by John Cunningham, Esq., F.G.S.

429. A coloured plaster cast of the relief of an impression of the hind foot of the *Cheirotherium Hercules* (*Labyrinthodon Salamandroïdes* ?).

The original is from the New Red Sandstone of Cheshire, and is described in the Proceedings of the Geological Society, by the *Donor, Sir Philip de M. Grey Egerton, Bart., M.P., F.R.S.*

430. A slab of sandstone, containing portions of impressions of the foot-prints, probably of a reptile (*Plectropus minitans,* or *Sauroidichnites minitans* of Hitchcock).

In this species the greater part of the sole of the foot was impressed upon the soil, the heel gradually sloping upwards.

From a formation intermediate between the lias and the coal, at Chicopee Falls, valley of the Connecticut, United States.

Perfect examples of the foot-prints of this species are represented in plate 9, figs. 2 & 3, of the work "On the Fossil Footmarks of the United States," 4to, 1848, by the *Donor, Prof. Hitchcock, D.D.*

Class PISCES.

Order PLAGIOSTOMI.

Family *Squalidæ*. (Shark-tribe.)

Genus *Carcharias*. (Sharks, represented by the White Shark of the Tropics.)

Subgenus *Carcharodon*.

431. A tooth of a large extinct Shark (*Carcharias* (*Carcharodon*) *megalodon*, Agassiz).

The length of the base of this tooth is four inches eight lines, that of the longest of its sides is five inches ten lines. With it is placed a tooth of an unusually large specimen of the largest known living species of *Carcharias*, the length of the base of which is one inch eight lines, and that of the longest of its sides two inches three lines. This tooth is from a Shark of about twenty feet in length: the fossil Shark, if bearing the same proportion to the teeth, must have been about sixty feet in length.

From the miocene tertiary formations of Malta. *Hunterian.*

432. Two teeth, of different sizes, one nearly as large as No. 431, of the great extinct Shark, *Carcharodon megalodon*, Agassiz.

The whole of the larger tooth is black, as if carbonized; in the smaller tooth much of the hard outer layer of dentine preserves its lighter colour.

Locality unnoted. *Hunterian.*

433. A tooth, with part of one side broken away, of the great extinct Shark (*Carcharodon megalodon*, Ag.).

It is of almost equal size with No. 431.

From the older tertiary deposits at Coquimbo, Chili, South America.

Presented by Charles Darwin, Esq., F.R.S.

434. A tooth of the great extinct Shark (*Carcharodon megalodon*, Ag.).

A longitudinal section has been removed from one of the basal angles, showing the thinness of the outer layer of hard dentine which resembles enamel. The fine serration of the trenchant edge of this formidable tooth is well shown on the entire side.

From the miocene formations of the Isle of Malta. *Hunterian.*

435. A tooth of the *Carcharodon megalodon*, Ag.

From the miocene formations of the Isle of Malta. *Hunterian.*

436. A tooth, with the base slightly mutilated, of the *Carcharodon megalodon.*

From the miocene formations of the Isle of Malta. *Hunterian.*

437. A tooth of the *Carcharodon megalodon.*

From the miocene formations of the Isle of Malta. *Hunterian.*

438. Two teeth, with the base mutilated, of the *Carcharodon megalodon.*

From the miocene formations of the Isle of Malta. *Hunterian.*

439. A tooth of the *Carcharodon megalodon.*

From the upper cretaceous deposits of Maestricht. *Hunterian.*

440. Three teeth of different sizes of the *Carcharodon megalodon*, Ag.

From the upper cretaceous deposits of Maestricht. *Hunterian.*

441. A tooth of the *Carcharodon megalodon*, Ag.

The middle of the flatter side of the tooth is unusually prominent.

From the upper cretaceous deposits of Maestricht. *Hunterian.*

442. One of the teeth, somewhat eroded and water-worn, of the *Carcharodon megalodon*, Ag.

From the Red Crag, Felixstow, Suffolk.

Presented by Professor Owen, F.R.S.

443. The greater part of the crown of a mutilated tooth of a great extinct Shark nearly allied to, or a variety of, the *Carcharodon megalodon*?

The finely serrated sides are rather more uniformly convex than in the foregoing larger examples of *Carcharodon megalodon*.

From the Island of Jamaica, and probably from a tertiary formation.

Presented by Sir Joseph Banks, Bart., P.R.S.

Subgenus *Carcharias*.

444. Two teeth, with the base more or less mutilated, of an extinct Shark, the *Carcharias productus*, Ag.

From tertiary deposits in Maryland, North America. *Hunterian.*

445. A water-worn specimen of the crown of a tooth of the *Carcharias lanceolatus*, Ag.

The locality is unnoted; but the specimen closely resembles in its condition the Shark's teeth from the tertiary crag of Suffolk.

A tooth of a recent Shark of the genus *Carcharias*, probably the White Shark, has been placed by Hunter with the fossil to illustrate its nature and affinities. *Hunterian.*

446. A tooth of the *Carcharias leptodon*, Ag.

Locality unnoted. *Hunterian.*

447. "Pieces of palates and teeth, worn down and polished by the water so as to have lost their shape."

The subjects of the above description in the Hunterian MS. Catalogue are teeth of Fishes, amongst which may be recognized the crowns of the teeth of an extinct Shark, the *Carcharias productus* of Agassiz.

From the miocene tertiary formations of the Island of Malta. *Hunterian.*

448. The crown of the tooth of an extinct Shark, the *Carcharias subserratus*, Ag.

The tooth of a recent species of *Carcharias* has been placed in the same tray to illustrate its nature.

From the eocene tertiary formations of the Isle of Sheppey, Kent. *Hunterian.*

449. A nodule of tertiary stone with a slightly distorted tooth of a Shark, of the genus *Carcharias*.

The crowns of a few teeth of a form resembling those ascribed to the Sharks of the genus *Lamna* are imbedded in the same nodule. *Hunterian.*

Genus *Hemipristis.* (Sharks allied to the Gray Shark, or Tope)

450. Two teeth of the *Hemipristis serra,* Ag.

From the tertiary formations called 'Molasse,' at Soleure, Switzerland.

Hunterian.

451. The crown of the tooth of the *Hemipristis serra,* Ag.

It is described in the MS. Catalogue as "A small thick serrated conic glossopetra." From its size and shape, it is probably from near the end of the maxillary series.

Locality unnoted. *Hunterian.*

Genus *Notidanus.* (Saw-toothed Sharks.)

452. A small portion of the gray chalk with the tooth of the *Notidanus microdon.*

From the cretaceous formations of Cambridgeshire.

Presented by Anthony White, Esq.

453. One of the serrated teeth of the *Notidanus primigenius.*

Locality unnoted. *Hunterian.*

Genus *Corax.* (Sharks allied to the Gray Shark, or Tope.)

454. A tooth of an extinct Shark, the *Corax falcatus,* Ag.

It is described in the original MS. Catalogue as "A small broad serrated tooth or 'glossopetra'."

Locality unnoted. *Hunterian.*

455. A tooth of the *Corax falcatus,* Ag.

From the chalk formation of Kent. *Hunterian.*

456. A portion of chalk with a tooth of the *Corax falcatus,* Ag.

Locality unnoted. *Hunterian.*

457. Three nodules of white chalk, each containing a tooth of the *Corax falcatus,* Ag.

From the cretaceous formations of Sussex.

Presented by John Gibson, Esq.

458. A portion of calcareous rock, with a tooth of the *Corax falcatus*, Ag.

From a tertiary formation in a mountain, 800 feet high, in Elephant Bay, South Africa, Lat. 13° S.

"Many fossils were here found by the officers of the 'Waterwitch,' 2000 feet above the level of the sea." Note by the *Donor, Lieut. Matson, R.N.*

459. Four teeth of the *Corax falcatus*, Ag.

Locality unnoted. *Hunterian.*

Genus *Otodus*. (Sharks allied to the Porbeagle Shark.)

460. A fine example of an almost symmetrically-shaped tooth of the *Otodus obliquus*.

The strong osseous base is bifurcate. The enamelled crown is straight, conical, with one side flat, the other convex, sharp-pointed, and with sharp finely serrated edges: there is a short similarly-shaped cusp on each side of the base; and each cusp has a minute external basal cusp. The entire figure of this very formidable tooth resembles the short and strong dagger or "crease" of the Malay pirates.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

461. A tooth of the *Otodus obliquus*, Ag., showing the obliquity characteristic of most of the teeth of this species.

From the neighbourhood of Frome, Somersetshire. *Purchased.*

462. Six teeth of the *Otodus obliquus*, Ag.

One of these specimens is nearly symmetrical, and is probably from near the middle or symphysis of the jaw; the rest are oblique.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

463. A tray of seven teeth of the *Otodus obliquus*, Ag.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

464. Four teeth of the *Otodus obliquus*, which from their size appear to have come from near the end of the dental series.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

465. A tooth of the *Otodus obliquus.* The basal cusp has not been developed on one side.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

466. A tooth of the *Otodus macrotus,* Ag.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

467. A tooth of the *Otodus lanceolatus,* Ag.

This tooth much resembles the symmetrical variety of the *Otodus obliquus*; but the crown is more slender, longer in proportion to its basal breadth, and the basal cusps are smaller.

Locality unnoted; but, by the colour, not from Sheppey: in that respect, and in the mineral condition, it resembles the Shark's teeth from Malta and Maestricht. *Hunterian.*

468. A smaller and somewhat mutilated tooth of the *Otodus lanceolatus,* wanting the basal cusps, and probably from near the end of the dental series in the jaw.

Locality unnoted, but resembling in colour and mineralized condition the preceding specimen. *Hunterian.*

469. A nodule of white chalk containing a tooth of the *Otodus appendiculatus,* Ag.

From the cretaceous formations of Sussex.

Presented by John Gibson, Esq.

Genus *Lamna.* (Sharks represented by the Blue Shark.)

470. Two fine teeth of the *Lamna elegans,* Ag.

The length of the bifurcate base is ten lines, that of the enamelled crown is twenty-two lines: the basal processes are small but sharp. See Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' p. 203. pl. 10. figs. 28 & 29.

From the eocene tertiary deposits of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

471. The moiety of a vertically bisected tooth of the *Lamna elegans.*

It shows by its lighter tint the thickness of the layer of hard dentine that invests the osteodentine forming the basis of the tooth.

From the eocene tertiary deposits of Bracklesham, Sussex.

Presented by Prof. Owen, F.R.S.

472. A longitudinal section of a tooth of the *Lamna elegans.*

It is cemented to a plate of glass to show its structure, by the aid of the microscope. See Owen's 'Odontography,' vol. i. p. 31. *Purchased.*

473. Four teeth of the *Lamna elegans.*

From the eocene tertiary formations of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

474. The crowns of four teeth of the *Lamna elegans.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

475. A tray of teeth, more or less mutilated, of the *Lamna elegans.*

From the eocene tertiary formations of Bracklesham, Sussex.

Presented by G. A. Coombe, Esq.

476. A tooth of the *Lamna elegans.*

From the obliquity of the bifurcate base it appears to have come from near the attached end of the jaw.

From the eocene tertiary formations of Bracklesham, Sussex.

Presented by Prof. Owen, F.R.S.

477. Two teeth, and the crown of a third worn by attrition since its fossilization, of the *Lamna elegans.*

From the shortness of the enamelled crown in proportion to the breadth of the bifurcate base, they seem to have come from the upper jaw.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

478. Four teeth, more or less mutilated, of the *Lamna acuminata.*

"Glossopetræ, Ornithoglossi, or birds'-beaks," Orig. MS. Cat.

From chalk-pits in Kent. *Hunterian.*

479. Three nodules of white chalk, each containing a tooth of the *Lamna acuminata,* Ag. From the cretaceous formations of Sussex.

Presented by John Gibson, Esq.

480. A portion of travertin, or calcareous cemented rock, containing the tooth of a Shark of the genus *Lamna,* resembling in form the *Lamna elegans* of Agassiz.

From a tertiary formation in a mountain 300 feet high, in Elephant Bay, South Africa, Lat. 13° S. *Presented by Lieut. Matson, R.N.*

Genus *Odontaspis.*

481. A tooth, and a portion of chalk marl containing another tooth, of the *Odontaspis raphiodon.*

From a chalk-pit in Kent. *Hunterian.*

Genus *Oxyrhina.*

482. Three teeth of the *Oxyrhina hastalis,* Ag.

From tertiary deposits in Maryland. *Hunterian.*

Genus *Galeocerdo.*

483. Five teeth of the *Galeocerdo latidens,* Ag.

See Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' p. 202. pl. 11. figs. 22 & 23.

These teeth are described in the original MS. Catalogue as "Small, broad serrated teeth, or Glossopetræ." A tooth of a recent Shark of the genus *Carcharias,* has been placed in the same tray to illustrate their nature.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Vertebræ of Sharks.

484. A mass of petrified clay cementing together a group of dislocated bodies of the vertebræ of a species of *Lamna,* probably *L. elegans.*

The centrum or vertebral body of a recent Shark of similar size, apparently of the genus *Alopias*, has been placed in the same tray to illustrate the nature of the fossils.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

485. The bodies of two vertebræ, cemented together by petrified clay, of the same species of Shark (*Lamna elegans*?).

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

486 The bodies of three vertebræ of a Shark, probably of the genus *Lamna.*

The antero-posterior diameter is less, and the interspaces of the bony laminæ are narrower and more numerous than in the vertebræ Nos. 484, 485.

"*l x.* 9. Three vertebræ of Sharks."—Hunterian MS. Catalogue.

One of the vertebræ has been much water-worn.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

487. A centrum of the same species of *Lamna.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

488. A centrum of a large Shark, probably of the genus *Otodus.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

489. The body of a somewhat smaller vertebra of the same large species of Shark (*Otodus*?).

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

490. The bodies of two small vertebræ of a Shark (*Lamna*?), cemented together by petrified clay.

They resemble those specimens figured by Agassiz in the 'Recherches sur les Poissons Fossiles,' tom. iii. tab. 40^b. fig. 23, and there referred to the genus *Lamna.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

491. A portion of petrified clay, including a series of centrums of ten caudal vertebræ of the Sheppey Tope, and other detached fragments of the skeleton of the *Eogaleus toliapicus*, Owen.

This specimen was numbered *l x*. 31 in the MS. Hunterian Catalogue, where it is described as "Ten vertebræ of a small fish, in their natural position, with several other bones in clay-stone, from Sheppey."

The Shark-like character of these vertebral elements is shown by the articular cavities for the neurapophyses and parapophyses: the bases of the neurapophyses are retained in some of the vertebræ. The sides of the vertebræ are formed by a smooth compact bone, as in the recent Tope (*Galeus communis*. (Compare with No. 401, Osteological Catalogue.)

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Family *Myliobatidæ*. (Sting-rays, Eagle-rays.)

Genus *Myliobatis.*

492. A portion of the mandible, and its dentigerous plate, of the *Myliobatis toliapicus*, Ag.

See Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' 4to. 1850, p. 198. pl. 10. figs. 3, 4 & 5.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

493. A large portion of one of the middle transversely elongated teeth from the dental plate of the *Myliobatis toliapicus.*

This specimen bears the name of *Siliquastrum Scopula* in the original MS. Catalogue.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

494. Portions of two of the middle teeth of the *Myliobatis toliapicus.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

495. The dentigerous plate of the upper jaw of the *Myliobatis Dixoni*, Ag.

It includes seven of the broad middle denticles, and one row of the small hexagonal denticles on each side. See Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' 4to. 1850. p. 198. tab. 10. figs. 1 & 2.

From the eocene tertiary formations of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

496. A portion of the base of the serrated dorso-caudal spine of a *Myliobatis*, probably *Myl. toliapicus*.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

497. Four specimens of the dermal bones, forming the bases of the spines of a species of Thornback (*Raia*).

From the pliocene deposits of the Norwich crag, Norfolk.

Presented by Robert Fitch, Esq.

Family *Hybodontes*.

(Extinct Sharks with broad and thick, commonly multicuspid, teeth.)

Genus *Hybodus*.

498. A tooth of the *Hybodus reticulatus*, Ag.

From the oolitic formations of Bath, Somersetshire. *Hunterian.*

499. A section of the dentigerous part of the jaw, with eight rows of teeth, of the *Hybodus reticulatus*.

From the Lias of Lyme Regis, Dorsetshire.

Presented by Sir P. de M. Grey Egerton, Bart., M.P., F.R.S.

500. A nodule of lias, with a fragment of the jaw, and a few teeth, of the *Hybodus reticulatus*, Ag.

Locality unnoted. *Hunterian.*

501. A fragment of pyritic rock, containing portions of the crown, one tolerably perfect, of the *Hybodus minor*.

This specimen is described in the original MS. Catalogue as "A slate or flat piece of marcasite, the surface all set with crystallized brassy marcasites.

On one surface is part of a jaw, with several snags on it, and a pretty large tooth, like a glossopetra, with a single small one detached from it." The part called 'jaw' is the broad multicuspid tooth of the *Hybodus*.

From the Triassic formation, called Bone-bed, at Pyrton Passage, Gloucestershire. *Hunterian.*

502. A block of coralline oolite, containing a tooth of the *Hybodus grossiconus*, Ag.

From the oolitic formations of Malton, Yorkshire.

Presented by Prof. Phillips, F.R.S.

503. A portion of the oolitic slate of Stonesfield, with a tooth of the *Hybodus grossiconus*.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

504. A portion of oolitic slate, with a tooth of the *Hybodus grossiconus*: the linear groove along the base of the tooth is well marked in this specimen.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

505. A small portion of oolitic slate, containing a tooth of the *Hybodus polyprion*.

A similar tooth of a cartilaginous fish (*Galeus*) has been placed by Hunter in the same tablet to illustrate the nature of the fossil.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

506. An oblong block of oolitic slate, in two pieces, containing the dorsal spine of a *Hybodus*, probably *Hyb. grossiconus*.

The spine is fractured just below the base of the ridged exserted portion, and exhibits the deep groove which traversed the back part of the spine. The outer surface of the exserted part is longitudinally grooved, but is too much mutilated for satisfactory specific distinction: the smooth implanted base is five inches in length.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

507. Three portions of a dorsal spine of the *Hybodus reticulatus*, imbedded in a mass of artificial stone.

Locality unnoted, probably from the Lias of Lyme Regis.

Presented by the Very Rev. Dr. Buckland, F.R.S.

508. Two portions of a dorsal spine of the *Hybodus reticulatus*.

The fractured surfaces show the size of the cavity of the spine, which, in the recent fish, was filled with hyaline cartilage, but is now occupied by oolitic slate-stone: the hinder margin of the spine is the broadest, and has not the strongly-ridged ganoine which forms the rest of the surface. These portions are called in the original Hunterian Catalogue, "*Plectronites altisulcati*, very curious, from Stonesfield Quarry, Oxfordshire." *Hunterian.*

509. Two smaller portions of the dorsal spine of the *Hybodus reticulatus.*

One of these shows the oblique beginning of the ridged ganoine which covers the exposed part of the weapon.

Locality unrecorded. *Hunterian.*

510. A slab of oolitic slate, in which is imbedded the dentated dorsal spine of a cartilaginous fish, the *Asteracanthus semiradiatus*, Ag.

This specimen is described in the original MS. Catalogue as "*r* 29. A jaw, long and sharp-pointed: it is deeply ribbed its length, and within set with several small hooked teeth: unknown of what animal, in Stunsfield stone."

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

511. A block of oolitic slate, with a fragment of the dorsal serrated spine of the *Pristacanthus securis.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

512. A portion of oolitic slate, with the dentated dorsal spine of the *Leptacanthus semistriatus.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

Family *Cestracionidæ.*

(Fishes having their nearest living representatives in the Cestracion or Port Jackson Shark.)

Genus *Acrodus.*

513. A portion of oolitic slate, with six teeth of the *Acrodus nobilis*, in natural juxtaposition. The hard dentinal covering has been broken away from part of one of these.

The term "Siliquastrum" is applied to these teeth in the original MS.

Catalogue. A portion of the dental covering of one of the jaws of the cartilaginous fish called *Cestracion Phillipi* is now placed in the same tray, to exemplify the nature and affinities of the teeth of the *Acrodus*. *Hunterian.*

514. One of the teeth of the *Acrodus nobilis*, with the bony base. *Hunterian.*

515. A portion of oolite, with a tooth of the *Acrodus nobilis*, the summit of which has been partly worn. It is called in the original MS. Catalogue, a "*Siliquastrum Limacula.*"

From the oolitic formations of the Wallcote Quarries, near Bath, Somersetshire. *Hunterian.*

516. A portion of oolitic stone, in which is imbedded half of a tooth of the *Acrodus nobilis*, Ag.

From the oolitic formations of Bath, Somersetshire. *Hunterian.*

517. A tooth of the *Acrodus gibbus* (?), Ag.

The rugæ are fewer and more strongly marked than in the specimen figured by M. Agassiz, in tab. 21, and this circumstance appears not to have escaped the eye of Hunter, for he describes the specimen, in the original MS. Catalogue, as "A small slug-palate of the *Limacula* kind, but a variety."

From the oolitic formations of Bath, Somersetshire. *Hunterian.*

518. A small tooth of the *Acrodus gibbus.*

From the oolitic formations of the Wallcote Quarries, near Bath, Somersetshire. *Hunterian.*

519. A portion of oolite, with a tooth of the *Acrodus gibberulus*, Ag.

In the original MS. Catalogue this is called "The slug-palate, or *Limacula*, from its resemblance to a slug."

From the oolitic formations of the Wallcote Quarries, near Bath, Somersetshire. *Hunterian.*

Genus *Strophodus.*

520. A portion of oolitic slate, with a tooth of the *Strophodus magnus.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

521. A portion of oolitic slate, with a small tooth of the *Strophodus magnus.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

522. A tooth of the *Strophodus magnus.*

A longitudinal and horizontal section has been taken from one end of this specimen.

From the oolitic formations in the neighbourhood of Bath, Somersetshire.

Presented by Prof. Owen, F.R.S.

523. A tooth of the *Strophodus magnus.* It appears to have been water-worn, and the grinding surface is polished by attrition.

This specimen is called, in the original MS. Catalogue, "*Siliquastrum phaseolatum.*"

From the oolitic slate of Stonesfield, Oxfordshire. *Hunterian.*

524. The dental part, broken away from the bony base, of one of the crushing teeth of the *Strophodus magnus.*

Locality unnoted. *Hunterian.*

525. Six teeth of the *Strophodus magnus.*

Locality unnoted. *Hunterian.*

526. A portion of a small tooth of the *Strophodus magnus.* It appears to have been water-worn, and is polished by attrition.

Locality unnoted. *Hunterian.*

527. One of the teeth of the *Strophodus reticulatus,* Ag.

It is fractured at one end. The ossified base is of the same depth or thickness as the crown of the tooth: the grinding surface is marked by very fine ridges, which diverge, chiefly in the transverse direction, from a longitudinal line or raphé near one of the borders of the tooth: the fine rugæ are slightly wavy and branched as they diverge: the form of the base is trapezoidal.

Probably from the Oolite, but the locality is not noted. *Hunterian.*

528. Several detached teeth of the *Strophodus tenuis,* Ag.

They are of various sizes; several of them have their roots: they are entered in the original MS. Catalogue as "Ephippium or Saddle-palates from the flag-stone quarries at Stonesfield, Oxfordshire."

From the oolitic formations of that locality. *Hunterian.*

529. A tooth, peculiarly contracted and elevated, of the *Strophodus tenuis.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

530. A cast of an unusually fine and large tooth of the *Psammodus rugosus,* Ag.

From the carboniferous limestone, Easky, Ireland.

Presented by the Earl of Enniskillen, D.C.L.

Genus *Ptychodus.*

531. A portion of white chalk, with three teeth of the *Ptychodus polygyrus.*

They are of small size, and may be either from a young fish, or from the outer border of the series of teeth, which are numerous, and are arranged in the same jaw in a manner analogous to those of the *Cestracion* and *Rhina.*

From the cretaceous formations of Sussex.

Presented by Prof. Owen, F.R.S.

532. A tooth of the *Ptychodus polygyrus.*

This is entered in the Hunterian MS. Catalogue as "The furrowed Palate, entire, with the root: it is fine, and the top is somewhat ground down, which shows that it belonged to an old fish. From the chalk-pits."

Locality unnoted, probably from Sussex. *Hunterian.*

533. A portion of white chalk, with a similar-sized tooth of the *Ptychodus polygyrus.*

Locality unnoted. *Hunterian.*

534. A portion of white chalk, with a tooth of larger size, but probably from near the end of the maxillary series, of the *Ptychodus polygyrus.*

From the cretaceous deposits of Sussex. *Presented by John Gibson, Esq.*

535. A tooth of larger size and more normal shape, of the *Ptychodus polygyrus.*

From the cretaceous formations of Kent. *Hunterian.*

536. A tooth of the *Ptychodus polygyrus.*

It presents the more common form, or that of the majority of the numerous teeth in the dental series of this fish.

From the cretaceous formations: locality unnoted. *Hunterian.*

537. A tooth of the *Ptychodus decurrens.*

From the cretaceous formations: locality unnoted. *Hunterian.*

538. An unusually fine specimen of a tooth of the *Ptychodus latissimus.*

From the cretaceous formations of Kent. *Hunterian.*

539. A vertically fractured tooth of the *Ptychodus latissimus.*

It shows the slightly radiating, chiefly vertical, course of the vascular canals extending through the vaso-dentine, and the depth of that principal substance of the tooth: the polished enamel-like ridged grinding surface consists of a thin stratum of hard dentine.

From the cretaceous formations near Tunbridge, Kent.

Presented by Prof. Owen, F.R.S.

540. A tooth of the *Ptychodus latissimus.*

"A fine large perfect *Siliquastrum sulcatum.*"—MS. Catalogue.

From the cretaceous deposits: locality unnoted. *Hunterian.*

541. A tooth of the *Ptychodus latissimus.*

This specimen, in its shape—somewhat longer than it is broad—agrees with the tooth ascribed to the same species, which is figured in Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' pl. 31. fig. 3. It is described in the Hunterian MS. Catalogue as "a fine large perfect *Siliquastrum sulcatum,*" and is stated to be "from chalk-pits."

Locality unnoted, probably Kent or Sussex. *Hunterian.*

542. A nodule of chalk, with a tooth of the *Ptychodus latissimus.*

From the cretaceous formations of Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

543. A slab of chalk, with a tooth of the *Ptychodus latissimus.*

Locality unnoted. *Hunterian.*

544. The grinding surface or summit of a tooth of the *Ptychodus latissimus.*
From a chalk-pit near Tunbridge, Kent. *Presented by Mrs. Smith.*

545. The crown, or triturating summit of a tooth of the *Ptychodus latissimus.*
From the Chalk of Kent. *Hunterian.*

546. A polished section of a tooth of the *Ptychodus latissimus.* The darker colour on the cut surface indicates the more compact layer of the dental substance.
From the Chalk of Kent. *Presented by Prof. Owen, F.R.S.*

547. A tooth of the *Ptychodus mammillaris.* This may be one of the small teeth, from near the margin of the dental series, of the *Ptychodus latissimus.*

It is described in the Hunterian MS. Catalogue as "the hump-palate: this is a palate about the size of a nut, rising irregularly, very convex, from the sides to the top, and like the others are furrowed across: this specimen is without a root."

From a 'chalk-pit:' locality unnoted. *Hunterian.*

548. A mass of chalk, to which is cemented a small portion of the close-set four-sided long and slender rays of one of the fins of a species of *Ptychodus.*
From a 'chalk-pit:' locality unnoted. *Hunterian.*

Genus *Ceratodus.*

549. A tooth of the *Ceratodus runcinatus.*
From the Keuper sandstone, Wurtemberg. *Hunterian.*

550. A portion of a tooth of the *Ceratodus palmatus.*
From the Keuper sandstone, Wurtemberg.
Presented by Prof. Kurr, M.D.

Order HOLOCEPHALI.

Family *Edaphodontidæ.*

(Cartilaginous Fishes, represented by the existing species called "Chimæræ.")

Genus *Ischyodus.*

551. The dentigerous portion of the left maxillary of the *Ischyodus* (*Chimæra*) *Egertoni*, Buckland.

This genus is characterized by the presence of a fourth mass or group of denticles, marked *e* in the specimen, situated between the largest mass near the symphysis, and the small mass near the outer margin: this fourth mass is not developed in the upper maxillary of the *Edaphodon.* See Sir P. de M. Grey Egerton "On the Nomenclature of the Fossil Chimæroid Fishes," Proceedings of the Geological Society, May 1847, p. 351; and Quarterly Journal of the Geological Society, vol. iii. pl. 13. fig. 1.

From the Kimmeridge clay, Oxford.

Presented by the Very Rev. Dr. Buckland, F.R.S.

Genus *Edaphodon.*

552. A portion of the left mandible of the *Edaphodon* (*Chimæra*) *Mantelli,* Buckland.

From the cretaceous formations, Lewes, Kent.

Presented by Sir P. de M. Grey Egerton, Bart., M.P.

Genus *Psaliodus.*

553. The dental plate of the left premaxillary of the *Psaliodus compressus,* Eg.

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

Genus *Elasmodus.*

554. The dental plate, and a small part of the bone of the right premaxillary of the *Elasmodus Hunteri.*

The dental plate consists of five vertical and slightly bent series of oblique and curved transverse plates; the median and longest series being strengthened by a supplementary dental column behind.

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

555. The dentary portion, somewhat mutilated, of the right mandible of, apparently, the same under jaw of the *Elasmodus Hunteri.*

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

556. The dentary portion of the left mandible of the *Elasmodus Hunteri.*

The dental substance is interblended with the osseous substance, which is black from the greater proportion of the animal matter it contained.

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

557. A section of one of the compound teeth of the *Elasmodus Hunteri.* It shows the close-set tubular and columnar denticles of which the dental mass is composed.

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

Order OSTRACOSTEI*.

Family *Cephalaspidæ*.

Genus *Coccosteus*.

558. One moiety of a split nodule of old red sandstone, containing the cephalothoracic shield of the *Coccosteus decipiens*.

It is composed of broad, suturally-united dermal osseous plates, the outer surface of which is finely granulated.

See Agassiz, 'Monographie des Poissons Fossiles du Système Dévonien,' p. 22. tab. 7–10.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

559. One moiety of a split nodule of old red sandstone, containing a great part of the dermal skeleton, with some bones of the head, a portion of jaw, with teeth, of the *Coccosteus decipiens*.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

560. A nodule of old red sandstone, containing a portion of the ramus of the jaw, with a few teeth, of the *Coccosteus oblongus*. The teeth, seven in number, of small size and oblong form, are placed close together near the fore part of the ramus, and are anchylosed to the substance of the bone.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

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* From *ὄστρᾰκον shell*, crustaceous shell of Aristotle, and *ὀστέον bone*; in reference to the disposition of the chief part of the bony substance, in the form of large external plates like the shells of the Crustacea; this excess of development of the dermal skeleton being associated with a soft or cartilaginous condition of the cranial neural arches, and of the centrums in the rest of the vertebral column, in all the members of the present extinct Order of Fishes.

561. A portion of a nodule of old red sandstone, with some of the dermal bones of the *Coccosteus oblongus*.

From the Old Red Sandstone of Cromarty, Ross-shire.

Presented by Hugh Miller, Esq.

Genus *Cephalaspis*.

562. A fragment of old red sandstone, with the impression and part of the substance of the dermal bony plate defending the head of the *Cephalaspis Lyellii*.

From the Old Red Sandstone of the Bridge of Allan, Stirlingshire.

Presented by Professor Quekett.

Family *Acanthodidæ*.

Genus *Cheiracanthus*.

563. One moiety of a split nodule of old red sandstone, containing a large proportion of the dermal bones and scales, with a portion of jaw and teeth, of the *Cheiracanthus Murchisoni*.

See Agassiz, 'Monographie des Poissons Fossiles du Système Dévonien,' p. 39. tab. 15.

From the Old Red Sandstone formations of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

564. The half of a nodule of old red sandstone, containing a portion of the skeleton of the *Diplacanthus striatulus*. The skeleton here preserved consists chiefly of the dermal part, which is composed of close-set ganoid scales; the defensive spines are long, slender, and with their exserted part longitudinally striated: a fracture of the base of one of these shows a cavity in the centre of that part: there is no appearance of vertebra in this Ichthyolite.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

565. A portion of old red sandstone, with the cranium of the *Chirolepis Cumingiæ*, showing its form in profile. The opercular, subopercular, and interopercular bones are preserved, with part of the pectoral fin.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

566. A portion of old red sandstone, containing a part of the cranium of the *Chirolepis Cumingiæ*. The jaws, with a single series of small acuminate teeth, are well shown in the specimen.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

Family *Dipteridæ*.

Genus *Diplopterus*.

567. A slab of old red sandstone, containing a great part of the head and dermal skeleton of the *Diplopterus macrocephalus*. The two rami of the lower jaw have been separated at the symphysis, and apparently divaricated. One of the rami shows four close-set conical teeth near the symphysis; the other ramus shows a series of much smaller teeth, extending from the symphysis backwards to beyond the middle of the ramus; a portion of the upper jaw of the same side shows a series of similar minute teeth; the pectoral fins are short and broad, with numerous very slender rays; small ganoid scales are continued upon their base.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

Genus *Osteolepis*.

568. The two tallying parts of a split nodule of old red sandstone, containing the head and part of the dermal skeleton of the *Osteolepis major*.

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

Family *Cœlacanthidæ.*

Genus *Glyptolepis.*

569. A portion of old red sandstone, containing part of the skull and dermal skeleton of the *Glyptolepis leptopterus.*

From the Old Red Sandstone of Lethen Bars, Ross-shire.

Presented by Lady Gordon Cuming.

Order GANOIDEI.

Family *Sauroidei.*

Genus *Lepidosteus.*

570. A portion of the eocene sand, containing a mass of the bones and ganoid scales of the *Lepidosteus punctatus.*

In this mass may be observed some of the smooth enamelled scales of the body, and the finely-ridged and tuberculated ganoid surface of some of the cranial bones, including what seem to be the opercular and subopercular bones.

From the eocene deposits at Hordwell, Hampshire.

Presented by A. Pytts Falconer, Esq.

Genus *Saurichthys.*

571. A portion of the bone-bed from Aust Passage, near Bristol, in which is imbedded a tooth of the *Saurichthys apicalis.* *Hunterian.*

Genus *Megalichthys.*

572. A slab of carboniferous shale, with a portion of the jaw and some of the smaller serial teeth of the *Megalichthys Hibberti.*

From the coal formations near Edinburgh. *Purchased.*

573. A slab of carboniferous shale, with one of the smaller teeth and a scale of the *Megalichthys Hibberti.*

From the coal formations near Edinburgh.

Presented by the Earl of Enniskillen, F.R.S.

574. A fragment of carboniferous shale, with portions of the larger teeth and a scale of the *Megalichthys Hibberti.*

From the coal formations of Carluke, Lanarkshire.

Presented by the Earl of Enniskillen, F.R.S.

575. A portion of carboniferous shale, with some of the ganoid scales of the *Megalichthys Hibberti.*

From the coal formations of Carluke, Lanarkshire.

Presented by the Earl of Enniskillen, F.R.S.

576. A portion of carboniferous limestone, with a scale of the *Megalichthys Hibberti.*

From the coal formations of Burdie House, near Edinburgh.

Presented by Professor Quekett.

577. A portion of carboniferous limestone, with a scale of the *Megalichthys Hibberti.* It shows the concentric lines of growth upon the inner surface of the scale.

From the coal formations of Burdie House, near Edinburgh.

Presented by Adam White, Esq., A.L.S.

578. The tallying parts of a split slab of a carboniferous rock, containing a large symmetrical lozenge-shaped scale or dermal bone of a ganoid fish, probably of the genus *Megalichthys.* The matrix also contains many shells of small entomostracous crustacea of the genus *Cypris.*

From the coal formations of Burdie House, near Edinburgh.

Presented by Adam White, Esq., A.L.S.

Family *Cœlacanthes.*

Genus *Holoptychius.*

579. A slab of carboniferous rock, with a long, subcompressed, slightly curved bone, probably scapula or coracoid, of the *Holoptychius nobilis.*

From the coal formations of Gilmerton, near Edinburgh.

Presented by Professor Quekett.

580. A slab of a light laminated carboniferous shale, with a portion of a long straight bone, bent lengthwise upon itself at a right angle, of the *Holoptychius nobilis.*

From the coal formations of Gilmerton, near Edinburgh.

Presented by Professor Quekett.

581. A portion of carboniferous shale, with part of the enamelled crown and complex base of a tooth of the *Holoptychius nobilis.*

From the coal formations of Gilmerton, near Edinburgh.

Presented by Professor Quekett.

582. A fragment of carboniferous shale, with portions of the scales of the *Holoptychius granulatus.*

From the coal formations near Edinburgh.

Presented by Leonard Horner, Esq., F.R.S.

Genus *Belonostomus.*

583. A slab of lithographic slate, with part of the skull, and the bodies of part of the vertebral column, of the *Belonostomus tenuirostris*, Ag. In the Hunterian MS. Catalogue it is described as " a middling-sized fish, crooked or twisted, with a long pointed snout or beak."

From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

Genus *Leptolepis.*

584. A portion of lithographic slate, with the impression and great part of the skeleton of the *Leptolepis dubius.*

From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

585. A slab of lithographic slate, with the impression and remains of the skeleton of the *Leptolepis dubius*.
From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

586. A slab of slate, like lithographic slate, containing the skeleton and impression of the trunk of the *Leptolepis dubius*.
From the oolitic formations of Mount Lebanon. *Hunterian.*

587. A portion of lithographic slate, with the impression and skeleton, lacking the tail, of the *Leptolepis dubius*.
From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

588. A portion of lithographic slate, containing a great part of the skeleton of the *Leptolepis dubius*.
From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

589. A portion of lithographic slate, with the impression and part of the skeleton of the *Leptolepis dubius*.
From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

590. A portion of lithographic slate, with the skeleton of the trunk of the *Leptolepis dubius*.
From the oolitic formations of Aichstadt, Germany. *Hunterian.*

591. A portion of lithographic slate, with the impression of the skull and vertebral column of the *Leptolepis dubius*.
From the oolitic formations of Aichstadt, Germany. *Hunterian.*

592. A portion of lithographic slate, with an impression of the skull and vertebral column of the *Leptolepis dubius*.
From the oolitic formations of Aichstadt, Germany. *Hunterian.*

593. A portion of lithographic slate, with part of the skeleton of the *Leptolepis dubius*.
From the oolitic formations of Pappenheim, near Solenhofen. *Hunterian.*

594. A portion of lithographic slate, with the impression of the *Leptolepis Knorrii*.
From the oolitic formations of Aichstadt, Germany. *Hunterian.*

595. A slab of lithographic slate, containing the impression of the *Leptolepis Knorrii*.
From the oolitic formations at Aichstadt, Germany. *Hunterian.*

596. A slab of lithographic slate, containing the impression and greater part of the skeleton of the *Leptolepis Knorrii*.
From the oolitic formations of Aichstadt, Germany. *Hunterian.*

597. A slab of lithographic slate, with the impression and part of the skeleton of the trunk and part of the head of the *Leptolepis Knorrii*. The impression sinks deeper into the slate in this than in most examples of fossil fishes from the same locality; and the granular character of the deepest impressed part along the abdominal surface of the fish indicates it to have been caused by the fully-developed ovaria.
From the oolitic formations of Solenhofen, Germany. *Hunterian.*

598. A slab of lithographic slate, with the impressions of several specimens of the *Leptolepis Sprattiformis*, Ag. In the Hunterian MS. Catalogue they are described as "small fish, like Anchovies."
From the oolitic formations of Pappenheim, near Solenhofen.
Hunterian.

599. A small slab of lithographic slate, with an impression and remains of the *Leptolepis contractus*.
From the oolitic formations of Pappenheim. *Hunterian.*

600. A slab of lithographic slate, containing impressions, one partial, the other almost entire, of two specimens of the *Leptolepis contractus*.
From the oolitic formations of Solenhofen. *Hunterian.*

601. A slab of lithographic slate, with a portion of the vertebral column and the beginning of the dorsal and the anal fins of the *Pleurichthys perla*.
From the oolitic formations of Solenhofen. *Hunterian.*

602. A slab of lithographic slate, containing part of the skeleton and the impression of the *Caturus furcatus*, Ag.
From the oolitic formations of Pappenheim. *Hunterian.*

Family *Lepidoidæ.*

Genus *Palæoniscus.*

603. A portion of a slaty marlstone called Kupferschiefer slate, with the impression of the *Palæoniscus Freieslebeni.* In the Hunterian MS. Catalogue this is described as "*l* 2. The head and body of a fish compressed, with numbers of the scales finely bronzed:" the latter expression refers to the thin layer of pyrites or sulphuret of copper which has been deposited upon the ganoid scales of the fossil fish.

From the Permian or Lower New Red formation of Eisleben, near Mansfeldt, Upper Saxony. *Hunterian.*

604. A portion of Kupferschiefer slate, with the dermal skeleton and some of the bones of the head of the *Palæoniscus Freieslebeni.* The pectoral and caudal fins are well shown in this specimen, the latter exemplifying the 'heterocercal' type of tail: some of the bones and scales have a coating of copper pyrites.

From the Permian formations of Mansfeldt, Upper Saxony. *Hunterian.*

605. A portion of Kupferschiefer slate, with the dermal skeleton of the body of a fine *Palæoniscus Freieslebeni.* The dorsal, ventral, anal, and caudal fins are well shown in this specimen.

From the Permian formations of Mansfeldt, Upper Saxony. *Hunterian.*

606. A portion of Kupferschiefer slate, with an impression and great part of the scales of one side of the *Palæoniscus Freieslebeni.* The 'heterocercal' tail is well shown in this specimen.

From the Permian formations of Eisleben, near Mansfeldt, Upper Saxony. *Hunterian.*

607. A portion of Kupferschiefer slate, with an impression of the *Palæoniscus Freieslebeni.*

From the Permian formations of Eisleben, near Mansfeldt, Upper Saxony. *Hunterian.*

608. A portion of Kupferschiefer slate, with an impression of the *Palæoniscus Freieslebeni.* From the Permian formations of Mansfeldt, Upper Saxony.
Hunterian.

609. A portion of Kupferschiefer slate, with an impression, and a great part of the scales, of the *Palæoniscus Freieslebeni.*
From the Permian formations of Mansfeldt, Upper Saxony. *Hunterian.*

610. A portion of the Kupferschiefer slate, with an impression of the *Palæoniscus Freieslebeni.*
From a copper mine near Wellengerode, in the district of Bulstein, in Hesse, Germany. *Hunterian.*

611. A portion of the Kupferschiefer slate, with an impression of the *Palæoniscus Freieslebeni.*
From the Permian formations of Riegelsdorff, near Cassel, Germany.
Hunterian.

612. A portion of Kupferschiefer slate, with an impression of a small specimen of the *Palæoniscus Freieslebeni.*
From the Permian formations of Osterode, in the Hartz Forest, Germany.
Hunterian.

613. A portion of Kupferschiefer slate, containing an impression and scales of the *Palæoniscus magnus.*
"*l.* 2. The impression of a fish; the head quite crushed, the tail also crushed: many of the scales are bronzed."—Hunterian MS. Catalogue.
From the Permian formations of Eisleben, near Mansfeldt, Upper Saxony.
Hunterian.

614. A portion of Kupferschiefer slate, containing an impression of the trunk of the *Palæoniscus magnus.* The dorsal, ventral, and anal fins, and especially the unequally-lobed caudal fin, are very well shown in this heterocercal fossil fish.
Locality unrecorded. *Hunterian.*

615. A split nodule of Kupferschiefer stone, displaying on the divided surfaces the impression and scales of the *Palæoniscus macropomus.*
Locality unnoted. *Hunterian.*

Genus *Platysomus.*

616. A portion of Kupferschiefer slate, with an impression of the *Platysomus gibbosus*, Ag.

"A fine impression on a copper slate of a fish, like a John Doree, the scales finely bronzed."—Hunterian MS. Catalogue.

From the Permian formations of Riegelsdorff, six miles from Cassel, Germany. *Hunterian.*

Genus *Tetragonolepis.*

617. A considerable part of the skeleton and ganoid scales of the *Tetragonolepis pustulatus*, cemented upon a mass of lias clay.

The finely-sculptured ganoid integument is preserved on both sides of this rare and beautiful specimen. Some ammonites of different sizes have been imbedded in the same piece of clay.

From the Lias of Lyme Regis, Dorsetshire. *Hunterian.*

Genus *Dapedius.*

618. A nodule of lias split down the middle, showing a considerable proportion of the skeleton and scales, with their impressions, of the *Dapedius Leachii*, Egerton (*Tetragonolepis Leachii*, Agass.). The scales of this extinct fish are finely serrated along their free or hinder border.

From the Lias of Lyme Regis, Dorsetshire. *Purchased.*

619. Four fragments of the *Dapedius granulatus.*

One of the fragments includes a great part of the vomerine bone, the palatal surface of which is beset with minute hemispheric teeth; anterior to these are two small teeth with flattened bilobed crowns.

Locality unnoted. *Hunterian*

Genus *Lepidotus*.

620. A nodule of Hastings sand, containing a fragment of the jaw with two teeth of the *Lepidotus Fittoni*.

From the Wealden formations near Hastings.

Presented by Dr. Fitton, F.R.S., F.G.S.

621. A portion of Wealden iron-sand with many teeth, and another portion with a scale, of the *Lepidotus Mantelli*.

From the Wealden formations of the Isle of Wight.

Presented by Benjamin Barrow, Esq., M.R.C.S.

622. A section of a portion of Wealden stone, showing the polished cut surfaces of the dense ganoid scales of the *Lepidotus Mantelli*.

From the Wealden formations of Tilgate, Sussex.

Presented by Prof. Owen, F.R.S.

623. A portion of oolitic slate, containing a tooth of the *Lepidotus maximus*.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

624. Two portions of oolitic slate, each containing one of the teeth of the *Lepidotus medius*, with a detached tooth.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

Genus *Sphærodus*.

625. Three teeth of the *Sphærodus gigas*.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

Genus *Microdus*.

626. A slab of Purbeck limestone, including a great part of the skeleton of the *Microdus radiatus*.

The vacant tract between the bases of the neural and hæmal arches indicates that the centrums were not ossified, and that the notochord was persistent, as in the existing fishes of the Amazon and Gambia, called *Lepidosiren* and *Protopterus*; and, as in those fishes, the pleurapophyses have been continued and deflected to form the hæmal arches and spines in the caudal region. The vertical diameter of the skull is considerable in proportion to its length, and the superoccipital developes a lofty triangular crest. The long neural spines of the abdominal vertebræ are crossed obliquely by the peculiar nucho-dermal ossicles. The interneural and dermoneural spines of the dorsal fin, and the interhæmal spines of a long anal fin, are preserved. One of the characteristic small flattened subcircular teeth of this Pycnodont fish is preserved in the upper jaw, most of which, together with the lower jaw, has been broken off. This is a larger and better preserved specimen than either of those described and figured in the 'Recherches sur les Poissons Fossiles,' tom. ii. tab. 69 *c*, on which M. Agassiz founded the species. It agrees with them in the radiating lines on the opercular bone, to which the specific name refers, and in the shorter, fewer, and less expanded middle rays of the caudal fin. Thirty-four neural spines are distinctly shown between the head and tail, the seventeen anterior of which are crossed by thirteen linear series of slender dermal bony rays, pointed at both ends and slightly overlapping each other in the same series; the uppermost of these rays support short expanded cuneiform appendages, which seem to have formed a spinous crest from the occiput to the dorsal fin.

In this fine specimen the osseous plates developed from the fore-part of the long neural and hæmal spines, and forming a complete bony septum between the muscular masses of the postabdominal portion of the trunk, are preserved and plainly visible in several places. Large ganoid scales are preserved along the lower part of the abdomen; they are of great vertical extent, with a thickened anterior border and a thin pectinate posterior border, near which the surface of the scale is finely punctate. Hunter describes this as "An elegant and curious specimen of the osteology of a fish like a small Turbot."—MS. Catalogue, No. *l*, 34.

From the upper oolitic formation called Purbeck-beds, in the Isle of Purbeck, Dorsetshire. *Hunterian.*

627. A slab of lithographic slate, containing the skeleton and impression of the *Microdus hexagonus*.

The dorsal, anal, and caudal fins are well preserved in this specimen which also shows the extension of the nucho-dermal ossicles over a great part of the dorsal region of the trunk.

From the oolitic formations of Solenhofen. *Hunterian.*

628. A portion of lithographic slate, with an impression of the *Microdus hexagonus.*

From the oolitic formations of Solenhofen. *Hunterian.*

Genus *Pycnodus.*

629. A portion of oolitic slate, with part of the vomer, containing the large middle rows and the two small rows of the right side of teeth, of the *Pycnodus Bucklandi.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

630. "A portion of the flagstone with a Bufonites in it, from Stonesfield."—Hunterian MS. Catalogue. This is the oolitic slate, with one of the large oval teeth of the middle row of the *Pycnodus Bucklandi.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

631. A tooth of the *Pycnodus Bucklandi.*

"A Bufonites or grinder of a fish, single, from Stonsfield."—Hunterian MS. Catalogue.

From the oolitic slate of the above-named locality in Oxfordshire. *Hunterian.*

632. Several of the large oval teeth of the middle row of the *Pycnodus Bucklandi.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

633. A portion of oolitic slate, with one of the smaller lateral rounded teeth of the *Pycnodus Bucklandi.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

634. Several of the smaller rounded teeth of the *Pycnodus Bucklandi.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

635. A portion of oolitic slate, with some teeth of the *Pycnodus parvus.*

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

Genus *Gyrodus.*

636. A portion of chalk, with two teeth of the *Gyrodus angustus.*

See Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' 4to. 1850, p. 370. pl. 30. fig. 14.

From the cretaceous deposits of Sussex. *Hunterian.*

637. The vomerine bone of the *Gyrodus umbilicatus,* with the five rows of teeth almost complete.

From the Kimmeridge clay of Oxfordshire.

Presented by Professor Owen, F.R.S.

Order PLECTOGNATHI.

Family *Gymnodontidæ.*

Genus *Diodon.*

638. Two of the compound lamellated teeth, or dental masses of the *Diodon Scillæ.*

They are described in the Hunterian MS. Catalogue as "Two very elegant palates; smooth and polished by the water; they are finely plated all through. From Malta."

From the miocene tertiary deposits of Malta. *Hunterian.*

639. A compound lamellated tooth, from which a vertical section has been removed, of the *Diodon Scillæ.*

A vertical section of the mandible and mandibular dental mass of an existing species of *Diodon,* of similar size to the fossil, is now added to exemplify its nature.

From the miocene tertiary deposits of Malta.

Presented by Professor Owen, F.R.S.

Genus *Balistes.*

640. A portion of an Ichthyodorulite or dermal spine of a fish, allied to, or of, the genus *Balistes.*

The convex enamelled side of this spine has two dentated borders.

A spine of an existing species of *Balistes* is now added to exemplify the nature of the fossil.

Locality unnoted. *Hunterian.*

Order ACANTHOPTERI.

Family *Percoides.*

Genus *Smerdis.*

641. A slab of Monte Bolca slate, containing the impression and part of the skeleton of the *Smerdis micracanthus.*

From the eocene tertiary formations of Mount Vesiena Nova, near Verona. *Hunterian.*

Genus *Myripristis.*

642. A slab of Monte Bolca slate, containing the skeleton of the *Myripristis homopterygius.*

From the eocene tertiary formations at Monte Bolca. *Hunterian.*

Family *Scomberoides.*

Genus *Anenchelum.*

643. The two tallying parts of a split slab of Engi-slate, showing a portion of the skeleton in relief, and the impression, of the *Anenchelum latum.*

From the cretaceous formations of Blattenberg, in the Canton of Glaris, Switzerland. *Hunterian.*

644. A slab of Engi-slate, with a portion of the skeleton of the *Anenchelum latum*.

From the cretaceous formations in the Canton of Glaris, Switzerland.

Hunterian.

Genus *Palæorhynchum.*

645. The two tallying parts of a split slab of Engi-slate, containing the impression and part of the skeleton of a *Palæorhynchum medium*.

From the cretaceous formations of Blattenberg, in the Canton of Glaris, Switzerland. *Hunterian.*

646. The two tallying portions of a split slab of Engi-slate, containing the impression and skeleton of a *Palæorhynchum Glarisianum* ?

From the cretaceous formations of Blattenberg, in the Canton Glaris, Switzerland. *Hunterian.*

Genus *Eucynodus*, n. g.

647. A large proportion of the bones of the head, with some anterior vertebræ of the trunk, of the *Eucynodus Hunteri*, n. sp., imbedded in eocene clay so as to expose the outer surface of the bones of the left side. The articular and a great part of the dentary elements of the left ramus of the lower jaw are preserved; seven subequal, distant, laniariform teeth are shown in the dentary piece. A part of the bony sclerotic protrudes from the orbital cavity. The exposed centrum of the anterior trunk vertebra is deeply concave, as in most bony fishes, at the articular ends, and is broader and deeper than it is long. This specimen indicates a fish of about six feet in length.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

648. A nodule of petrified clay, with the articular element of the mandible, and a small flat squamous bone, of the *Eucynodus Hunteri*.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Cybium.*

649. A mass of petrified and pyritic clay, cementing together most of the bones of the head of the *Cybium macropomum.* The specific name of this extinct scomberoid fish refers to the great size of the opercular flap, of which the preopercular, opercular, and part of the subopercular and interopercular bones are preserved, on the right side. The base of the hypotympanic is a straight line, forming the harmonia with the pretympanic. The sclerotals of the right eye are preserved; some of the teeth remain in the premaxillary and dentary bones on both sides.

A vertebral centrum at the back part of this fine fossil shows a full elliptic articular concavity, broadest transversely; the sides are excavated and are reticulate.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

650. A part of the right premaxillary, palatine, and premandibular bones of the *Cybium macropomum.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Dictyodus.*

651. A portion of the right dentary bone of the mandible, with the bases of twelve teeth, and some intervening empty sockets, of the *Dictyodus destructor.*

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

652. A portion of the left dentary bone of the mandible, with the bases of eight teeth, of the *Dictyodus destructor.*

The developed teeth, the crowns of which have been more or less fractured, are lodged in sockets to which their bases have become anchylosed; some sockets of reserve, and the gubernacular orifices leading to others, for the matrices of successional teeth, are shown, alternating irregularly with the teeth in use.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

653. Some of the bones of the upper and back part of the cranium of a fish, of, probably, the Sphyrenoid family.

The exoccipitals develope large articular facets for the atlas; the superoccipital inclines much forwards as it rises from the foramen magnum; the upper surface of the cranium does not show any spines or ridges, but is gently convex.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Cœlopoma.*

654. The cranium of a species of *Cœlopoma.*

The basioccipital is excavated beneath; its slightly concave articular surface for the body of the atlas very little exceeds the size of the articular surfaces on the exoccipitals for the neurapophyses of the atlas. The superoccipital developes a sharp ridge from the midline of the whole extent of the upper surface; the paroccipitals form four-sided cones on each side of the occipital spine; a ridge extends from the summit of each of these cones forward over the parietal to the postfrontal; another ridge extends from the postfrontal backwards and outwards to the articular surface of the paroccipital. The mastoid presents an oval articular cavity for the epitympanic; the alisphenoid sends a buttress-like ridge to that cavity; the basisphenoid is at first rather flat beneath, then becomes carinate, and is again flattened where it is continued into the presphenoid; the vomer expands anteriorly into a slightly concave surface. The frontal is broad, with an irregular undulating upper surface; the orbits are wide.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

655. A mass of petrified and pyritic clay, cementing together the greater part of the bones of the head of the *Cœlopoma curvatum.*

The tympanic pedicle describes an unusual degree of curvature, with the concavity turned forwards: the mandible is deep; the cranium broad and short.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Presented by Prof. Edward Forbes, F.R.S.

656. The back part of the cranium, with a few vertebræ, of the same species of *Cœlopoma.*

The sides and under part of the vertebral body are excavated. The parapophysis is of great length, and in the second vertebra is inclined upwards. The body of the atlas is short.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

657. The bones of the back part of the skull of a large fossil fish, allied or belonging to the genus *Cœlopoma.*

The basioccipital is longitudinally depressed on the middle of its under surface, which is divided by prominent borders from the concave side. The exoccipitals each form a large quadrate articular surface for the atlas. The basi-pre-sphenoid is long, narrow, and becomes flattened below as it approaches the vomer.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Amphiristus.*

658. A fragment of the base of the skull of an osseous fish, *Amphiristus toliapicus* ?, including the basioccipital, exoccipitals, and part of the basisphenoid. The basioccipital is perforated above the articular surface for the atlas, as in some Siluroids; the exoccipitals form each a broad flat articular surface for the neurapophyses of the atlas. The under surface of the basioccipital expands, and receives the hinder point of the basisphenoid in a median groove. The under surface of the basisphenoid is slightly concave mesially and convex laterally, where it expands to join the petrosal and form the lower wall of the large ear-chamber.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

659. A fragment of the base of the skull of an osseous fish, *Amphiristus toliapicus* ?, including the basioccipital, and parts of the exoccipitals and basisphenoid. It exhibits the same tripartite articulation for the first vertebra of the trunk; the same expansion of the basisphenoid; and it appears to be of the same species as the preceding specimen.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Toxopoma*, n. g.

660. A great proportion of the bones of the head, cemented on a nodule of pyritic London clay, of the *Toxopoma politum*, n. s. The teeth are small, conical, pointed, anchylosed in the mandible to the alveolar wall of the dentary bone. The tympanic pedicle extends obliquely backwards from the mastoid, and then curves forwards to form the 'joint for the lower jaw,' thus giving an unusually curved form to the entire opercular appendage: the opercular bone is much expanded, and shows a smooth and polished external surface.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Acropoma*, n. g.

661. A large nodule of petrified clay, containing most of the bones of the head of the *Acropoma alta*, n. s. The matrix has been removed, together with part of the osseous texture, from the left side of the skull, and from the right premaxillary, hypotympanic, and right ramus of the lower jaw; part of an anterior trunk-vertebra is also exposed. A thin but lofty crest has been developed from the superoccipital. The bony sclerotic of the eye-ball protrudes from the socket. Both premaxillary and dentary bones are armed with short strong laniariform teeth, largest at the fore-part of the mouth. The tympanic pedicle and its opercular appendage are remarkable for their vertical extent; the jaws are short in proportion to the height of the head.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Rhinocephalus*.

662. A mass of petrified clay, cementing together some of the bones of the head and a few vertebræ of the *Rhinocephalus planiceps*. The right tympanic pedicle and mandibular ramus are best preserved, and the remaining portion of the dentary piece shows a few subulate teeth; the articular piece is broad, short, and bent upon itself lengthwise, at a right angle. Part of the pharyngeal

bones with the bases of small teeth may be discerned amongst the debris of the branchiostegal rays.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Presented by Prof. Owen, F.R.S.

Genus *Cariniceps,* n. g.

663. A large proportion of the bones of the head of the *Cariniceps compressus,* n. s.

The articular concavity of the basioccipital is of an oval form, with the long diameter vertical; the exoccipitals form more narrow elliptical surfaces, about half the size of the basioccipital one; a sharp ridge extends from each exoccipital to the mastoid; the inferior surface of the basioccipital, basi-presphenoid and vomer is carinate; the upper surface of the cranium is divided by a well-developed occipital crest. The orbits are very capacious: the sclerotals of both eyes have been preserved.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Platygenys.*

664. A portion of the skull, cemented upon a nodule of petrified clay, of the *Platygenys rugosus,* n. s. It includes the hypotympanics, entopterygoids, hinder portions of the mandibular rami, including the articular and beginning of the dentary elements, with some teeth and fragments of the mesotympanics, frontals, and branchiostegal rays. Where the outer surface of the bone is preserved it shows a wrinkled character, which is well-marked on the left hypotympanic. This bone presents the form of an almost equilateral triangle. The articular condyle is comparatively small; the teeth, six of which are preserved, are long, slender, cylindrical, subulate, close-set, and are continued to near the summit of the coronoid process.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Presented by Prof. Owen, F.R.S.

665. The hypotympanic and part of the left dentary bone, with the bases of seven wide-set teeth, of a fish.

In the Hunterian MS. Catalogue this specimen is described as "*m* 21, Part of the jaw-bone with the teeth, and also part of the femur of an Alligator."

The articular extremity of the hypotympanic has a remote resemblance to the femoral condyles of a reptile; but the expansion and peculiar shape of the body of the bone demonstrate its piscine nature.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Brychætus.*

666. A portion of the left premaxillary, with fragments of other skull-bones cemented to a mass of eocene clay, of the *Brychætus Mülleri.*

Seven teeth are anchylosed to the premaxillary: their osseous bases appear like alveolar processes extending separately about half an inch from the dentary border of the bone, with the enamelled crowns of the teeth projecting from their summits: a longitudinal section from one of the teeth shows the continuity of the apparent socket with the enamelled tooth, and the remains of the pulp-cavity in the osseous base.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

667. A portion of the left dentary bone of the *Brychætus Mülleri,* with eight of the large conical, antero-posteriorly compressed teeth.

From the eocene formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Pygacanthus.*

668. A great part of the trunk, cemented upon a mass of petrified clay, of the *Pygacanthus altus,* n. s. The neural arches of the four anterior vertebræ, which are exposed, show long spines with lateral grooves: the pleurapophyses are well curved, and have been articulated to depressions in the centrums, which have not here developed parapophyses: the left coracoid is preserved. The anal fin has commenced with a very strong spine. The scales are cycloid, but the free border is worn away in most of them.

From the eocene deposits of the Isle of Sheppey, Kent.

Hunterian.

Genus *Tetrapterus.*

669. The opercular bone, somewhat mutilated, of the *Tetrapterus priscus*, Ag.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Cœlorhynchus.*

670. Two portions of the prolonged premaxillaries forming the rounded rapier-like rostral weapon of the *Cœlorhynchus rectus.*

See Dixon's 'Geology and Fossils of the Tertiary and Cretaceous Formations of Sussex,' p. 205. pl. 10. fig. 14–17.

From the eocene tertiary formations of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

Order PHARYNGOGNATHI.

Family *Labridæ.*

671. A portion of a pharyngeal bone, with numerous close-set hemispherical teeth, of apparently a Labroid fish.

It is stated in the Hunterian MS. Catalogue to be from Stonesfield, Oxfordshire; but it has not undergone the mineralogical change exhibited by the true fossils of that oolitic formation. *Hunterian.*

Genus *Pisodus.*

672. A long oval flattened plate, with many teeth, of the *Pisodus Oweni*, Ag. In the present unique specimen the teeth are distributed irregularly over the whole of the unworn upper surface and in pretty close contact, except where they have been displaced by attrition, as from the large flat and polished surface at the anterior part of the bone, or where they have been broken or shed at the interspaces of the unworn teeth. These present the same form and nearly the same size; they have a hemispherical smooth and polished crown, and are inserted each by a large short hollow conical fang or base into a socket

of corresponding form and dimensions ; the crowns of some of the teeth project two lines beyond the surface of the bone, others are just protruding above that surface, indicating that they are shed and renewed in vertical succession : the middle of the edentulous anterior surface is worn smooth and flat, but its circumference is pitted with the remains of the sockets. Where the developed teeth have been displaced, a foramen in the middle of their shallow alveolus leads to a formative alveolus of their successor beneath. On the under surface of the dental plate there is a regular elliptical space occupying four-fifths of that surface, and defined by a raised margin ; this indicates the place of attachment of the plate to another bone of the skull, probably, as in the recent fishes called *Glossodus* and *Arapaima,* to a median bone of the hyoid arch. The teeth of the *Pisodus* are adapted for crushing shells, crustacea, or vegetable substances ; their texture is extremely dense, and corresponds with that of the teeth of the Microdon.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

673. A small portion of the dentigerous part of, probably, the answerable bone, of the *Pisodus Oweni,* with smaller and more close-set hemispheric teeth.

From the eocene formations of the Isle of Sheppey, Kent.

Hunterian.

674. A small portion of the dentigerous plate of the *Pisodus Oweni,* Ag. See Owen's 'Odontography,' p. 138. pl. 47. fig. 3.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

Genus *Phyllodus.*

675. The dentigerous plate of the *Phyllodus petiolatus.*

It consists of a mass of lamelliform teeth, of which, at the thicker back part, as many as seven may be seen successively superimposed : the middle of this end of the plate is compressed and slightly produced, like the short stalk of a leaf, which the entire plate resembles in shape.

The median row of large transverse plates includes seven of them : the teeth rapidly become smaller and more hemispheric as they approach the border.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

676. The dentigerous plate of the *Phyllodus polyodus*, Ag.

The median row includes three broad teeth.

In the original MS. Catalogue this specimen is described as "the beaded or paved palate, found but very seldom."

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Genus *Platylæmus.*

677. A dental plate of the *Platylæmus Colei.*

It is one of the unsymmetrical kind, deemed by its discoverer to resemble an upper pharyngeal dental plate of a *Labrus.* See 'Dixon's Geology and Fossils of the Tertiary and Cretaceous Deposits of Sussex,' 4to. 1850, p. 205. pl. 12. fig. 11.

From the eocene tertiary formations of Bracklesham, Sussex.

Presented by Frederick Dixon, Esq., F.G.S.

Order MALACOPTERI.

Suborder *Abdominales.*

Family *Esocidæ.*

Genus *Planesox*, n. g.

678. The bones of the head and a few of the trunk, cemented on a mass of eocene clay, of the *Planesox vorax*, n. s.

The upper part of the cranium is traversed by low occipital, parietal, and fronto-mastoid ridges; a thicker and more obtuse ridge divides the occipital from the frontal region: the maxillary is edentulous; the mandible is short, deep, and is armed with a few distant long laniariform teeth, and many minute teeth. The orbits are large, oval, with the long axis horizontal.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian

Family *Characini.*

Genus *Platops.*

679. The chief part of the bones of the head of the *Platops subulidens*, n. sp., cemented together by a mass of the petrified London clay and pyritic matter.

On the upper part of the cranium may be seen the mastoids, parietals, postfrontals, frontals, and the nasal bone. The inner margins of the frontals are slightly raised at the frontal suture, and a higher ridge seems to have been continued from the sagittal suture, where the short parietals appear also to have met at the middle line. The superoccipital crest is lofty. The nasal expands anteriorly, where it developes a low tubercle at each angle. The nasal branch of the premaxillary is very short; the alveolar or horizontal branch forms the anterior third of the dentigerous border of the upper jaw; the rest of that border is formed by the superior maxillary, which contains about twenty close-set cylindrical teeth, less than one line in diameter, and from three to four lines in length, with rather obtuse points. The premaxillary teeth are longer, larger, fewer in number, and are similar in shape; but the points of most of them are broken off. One of these subulate teeth, near the hinder angle of the premaxillary, is half an inch in length. The maxillary, which forms more than two-thirds of the dentigerous border of the upper jaw, is continued directly backwards from the angle of the premaxillary, as in the Salmon-tribe: the teeth are close-set at their anchylosed bases; but many of the alternate teeth have been broken off or shed. A scale-bone—the labial bone—is placed above the hinder angle of the maxillary. The teeth in the dentary piece of the mandible are larger than those above, but are of similar form. The hinder end of the premaxillary overlaps the mandible. The antorbital or lacrymal bone is of small size, but the wide space between the eye-ball and tympanic pedicle is occupied by three very large suborbital bones, beneath which the broad pterygoid may be seen abutting against the hypotympanic. The tympanic pedicle is long and arched; the opercular bone is large, semicircular, slightly convex externally, and strongly marked by radiating striæ. The eye is of moderate proportions; the border of the bony sclerotic is visible on the right side. The general form of the head is high, subcompressed, and with the part anterior to the orbit short; the length of the head being chiefly due to the great extent of the space between the orbit and tympanic pedicle, and to the large size of the opercular flap.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

680. The basioccipital and the bodies of two consecutive vertebræ of the *Platops subulidens*, dislocated, but cemented together by the petrified clay.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

Family *Halecoidæ.*

Genus *Sciænurus.*

681. A nodule of petrified clay, with the bones of the head, some anterior trunk-vertebræ, and some scales of the *Sciænurus brevior*.

The vomer developes a rough tubercle from the middle of its upper surface; the lacrymal has deep longitudinal grooves, and seems to send down bony rays from its lower border; the operculum is covered by cycloid scales; the mouth is short and wide, and the skull lofty in proportion to its length.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

682. The skull of the *Sciænurus crassior*, the bones of which are cemented together upon a mass of petrified clay. The lacrymal, or large anterior suborbital bone, is impressed externally by strong radiating grooves and ridges. Part of the bony sclerotic is preserved in both orbits; many of the branchiostegal rays are exposed to view.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

683. Some of the cranial bones and a few of the trunk-vertebræ of the *Sciænurus longior*.

The scales are well preserved upon the large opercular bone. The middle trunk-vertebræ are longer than they are broad, and show two lateral depressions.

From the eocene deposits of the Isle of Sheppey, Kent. *Hunterian.*

Genus *Megalops.*

684. A portion of the skull, a few vertebræ and scales, cemented together upon a mass of petrified clay, of the *Megalops priscus*, Ag.

It includes the occipital and parieto-mastoid portion of the cranium, the left tympanic pedicle, and its appendage the opercular bones; the true opercular bone is of great extent.

From the eocene tertiary formations of the Isle of Sheppey, Kent. *Hunterian.*

Genus *Halecopsis.*

685. Most of the bones of the head of a Salmonoid fish, *Halecopsis levis*, cemented together upon a nodule of petrified clay.

From the eocene deposits of the Isle of Sheppey, Kent. *Hunterian.*

686. Most of the bones of the head and the scaly integument of part of the trunk, cemented together upon a nodule of petrified clay, of the *Halecopsis levis.*

From the eocene tertiary formations of the Isle of Sheppey, Kent. *Hunterian.*

687. Some of the bones of the head, with the ventral scales and pectoral fins, of the *Halecopsis levis.*

The tympanic pedicles and part of the opercular appendages, the scapular arch, and portions of the frontal, postfrontal, and mandibular bones are recognizable; the whole is cemented together on a mass of eocene clay.

From the eocene tertiary formations of the Isle of Sheppey, Kent. *Hunterian.*

Genus *Clupæa.*

688. The two tallying portions of a split slab of tertiary slate, with the impression and part of the skeleton of the *Clupæa megaptera.*

From the tertiary formations of Blattenberg, in the Engi-Canton of Glaris, Switzerland. *Hunterian.*

689. The two tallying portions of a split slab of tertiary slate, containing the impression of part of the vertebral column of a fish, probably *Clupæa megaptera.*

From the tertiary formations of the Engi-Canton of Glaris, Switzerland. *Hunterian.*

690. A slab of the eocene slate of Monte Bolca, with an impression and great part of the skeleton of the *Clupæa catopygoptera.*

From the eocene tertiary formations of Monte Bolca, Œningen.

Presented by Captain Sir Everard Home, Bart., R.N., F.R.S.

Genus *Mallotus.*

691. " A flattish nodule of the kind called 'rivulet stone,' split; one half entire, the other half wanting the bottom part; they are tallying pieces, with a fine impression of a fish imbedded in them; a most elegant, rare, and curious fossil from Iceland in the North Seas."—Hunterian MS. Catalogue.

The matrix of this ichthyolite consists of indurated marl or clay, which, attracted by and hardening around the body of the fish, forms a nodule, and such nodules are not uncommon along the coasts of Iceland.

The fossil fish itself belongs to a species which still exists near the shores of Iceland—the *Salmo villosus* of Linnæus, *Mallotus villosus* of later naturalists.

Of many hundred species of fossil fishes submitted to the examination of Prof. Agassiz, the present is the only one which he could satisfactorily identify with any fish now living.

These ichthyolites are of recent date, and similar ones are probably still in progress of formation.

Hunterian.

692. A nodule of alluvial deposit, called 'rivulet-stone' by the older geologists, from which portions have been detached, exposing the impression and some of the bones and scales of a small Salmonoid fish, *Mallotus villosus*.

From Iceland. *Hunterian.*

693. The half of a nodule of alluvial deposit, called 'rivulet-stone,' containing the impression and some of the bones and scales of the *Mallotus villosus*.

From Iceland. *Hunterian.*

Family *Cyprinoides*.

Genus *Leuciscus*.

694. A slab of the tertiary slate of Œningen, containing the impression, with part of the skeleton, of the *Leuciscus Œningensis*. The dorsal, ventral, anal, and caudal fins are preserved, together with the pigmental matter of the eye: the vertebral column has been dislocated in the tail.

From the eocene tertiary formations of Monte Bolca, Œningen.

Hunterian.

695. A slab of tertiary slate, containing the skeleton and impression of the *Leuciscus Œningensis*, Ag.

From the eocene tertiary formations of Monte Bolca, Œningen.

Hunterian.

696. A slab of the eocene clay of Monte Bolca, with the impression and great part of the skeleton of the *Leuciscus latiusculus*. This may be only the female of *Leuciscus Œningensis*, laden with spawn.

From the eocene tertiary formations of Monte Bolca, Œningen.

Hunterian.

Vertebræ of Fossil Fishes.

697. Five consecutive vertebræ from near the end of the tail of a species of Tunny (*Thynnus toliapicus*).

The sides of the bodies of the three anterior vertebræ present a longitudinal median broad convex tract, between an upper and lower deep depression; those of the fourth vertebra are nearly flat. The neural and hæmal arches, as in some of the caudal vertebræ of the existing Tunny, are depressed and extended almost horizontally backwards, so as to give a cubical form to the entire vertebra. The broad flattened neural and hæmal spines of one vertebra are pressed, as it were, into the neural and hæmal canals of the succeeding vertebra, the series having been thus naturally interlocked and fossilized in that peculiar mode of juxtaposition.

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

698. The bodies of two similar vertebræ of a fish, apparently of the Scomberoid family. They are cemented together by petrified clay.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

699. The body of a vertebra, with the articular conical surface of a contiguous vertebra cemented thereto by petrified clay, of a fish, apparently of the Scomberoid family. This specimen is described in the Hunterian MS. Catalogue as "1 *x* 24. The vertebra of a fish, with an impression of the intervertebral substance."

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

700. The bodies of six caudal or post-abdominal vertebræ of a fish, of apparently the Scomberoid family.

In the same tray Hunter has placed the body of a vertebra of the *Lophius piscatorius*, which illustrates the general nature of the fossils as being the biconcave vertebræ of a fish. They differ from the recent vertebra placed with them by reason of the deep and wide vacuities in the external part of the bony structure; and they also differ amongst themselves in the number and extent of those vacuities, indicating them to belong to different species of extinct fishes.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

701. A slightly mutilated trunk-vertebra of a Scomberoid fish, allied to the Tunny (*Thynnus*).

The osseous substance is compact, and most of its free surface is smooth: both neural and hæmal arches are anchylosed to the centrum, which is rather broader than it is high, or than it is long: the articular cones are not deep, and their base forms a full transverse oval; the neural arch is low and broad; it sends off two wedge-shaped prozygapophyses, and a pair of postzygapophyses. The fractured base of the neural spine shows it to have been of small extent compared with the arch. An oblique ridge continued from the base of the parapophysis divides the two depressions on the sides of the centrum. A small vascular arch is defined by a hypapophysis, which extends backwards in a triangular form, with two oblique surfaces for articulation with the anterior hypapophyses of the next vertebra. Probably from a tertiary formation.

Locality unnoted. *Hunterian.*

702. The centrum of a vertebra of a large fish, in general shape resembling the preceding specimen, and probably from a species of the Scomberoid family.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

703. The centrums of three vertebræ of a fish, apparently of the Scomberoid family.

The length nearly equals the breadth; the sides present three large and deep longitudinal excavations, and there is a similar one along the middle of the inferior surface, opposite to the neural canal above. This canal, which is narrower than the inferior depressions, is bounded by the coalesced lamelliform bases of the neurapophyses which are broken away. The articular concavities are of moderate depth, and marked by fine concentric striæ.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

704. Two vertebræ, with some ribs and scales of a fish, cemented together by London clay, probably *Dictyodus* or *Sphyrænodus.*

The centrum is as long as it is broad, with moderately deep conical articular cavities marked by concentric lines; there is a deep impression at the upper and lower part of each side; the parapophysis extends from below the lower pit; the neurapophysis is a thin and broad plate; the portions of ribs preserved show them to have been long and slender.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

705. The bodies of three caudal vertebræ, cemented together by London clay, of a fish.

They are shorter than they are broad, with a very large and deep pit at the base of the neurapophysis, and another at that of the parapophysis, the two depressions being divided by a longitudinal convex ridge; the hæmal groove is a wide and deep depression; the neural groove is more narrow and shallow; both have reticulated floors.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

706. The centrums of three vertebræ, cemented together by London clay, of a fish, apparently of the Scomberoid family.

One of these, which is from the fore-part of the trunk, is shorter than it is broad; the other two are longer; but all show the character of two deep cavities on each side of the centrum. The neural arch is confluent with the centrum in the first short vertebra: the direction of the parapophyses in the two longer vertebræ indicate them to have come from the tail.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

707. The bodies of four caudal vertebræ, cemented together by London clay, of a fish. They are longer than they are broad, and present two lateral, besides the neural and hæmal, depressions. The articular concavity seems to have been lined by an epiphysial plate: one of these bodies is much smaller than the others.

From the eocene tertiary deposits of the Isle of Sheppey, Kent.

Hunterian.

708. A portion of eocene clay, cementing together three displaced vertebræ of a fish, of probably the Scomberoid family. The body is longer than it is broad, with an upper and lower longitudinal depression on each side; the base of the neurapophysis is narrow and rapidly contracts as it rises; the hæmal canal is broad and shallow: the free surface of these vertebræ is smooth and polished.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

709. The bodies, with the coalesced bases of the neurapophyses and hæmapophyses, of four caudal vertebræ, cemented together by London clay, of a fish, of probably the Scomberoid family.

The neural and hæmal arches are broad, and very obliquely bent backwards so as to envelope those of the succeeding vertebræ, as in the Tunny (*Thynnus*). The sides of the body present an upper and a lower deep and wide depression.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

710. The body of an abdominal vertebra of a fish.

It is longer than it is broad, and has a strong longitudinal ridge on each side dividing two large and deep depressions: the neurapophyses are coextensive with the neural canal, the floor of which shows deep irregular pits; the wider hæmal groove is similarly broken; the parapophyses have diverged from about one-half of its extent; the articular concavities are deep and strongly impressed by converging lines.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

711. A caudal vertebra, with the neural and hæmal arches mutilated, of a fish of the *Xiphioid* or Sword-fish family, probably of the genus *Cœlorhynchus.*

The body is deeper than it is broad and longer than it is deep; the contour of the deep conical articular cavity is a full ellipse; the sides are compressed, and are concave and rugous lengthwise; the base of one of the deflected parapophyses is perforated; the hæmal canal is deep; the walls of the narrower neural canal have been broken away. Hunter has placed a similarly sized caudal vertebra of the *Istiophorus* or round-bladed Sword-fish, to exemplify the nature and affinities of the fossil.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

712. A similarly mutilated vertebra of the same species of Xiphioid fish; the middle part of each side of the centrum is ridged, dividing the compressed parts near the fractured bases of the neural and hæmal arches.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

713. A caudal vertebra, with the neural and hæmal arches broken away, from apparently the same species of Xiphioid fish.

The centrum is long in proportion to its breadth, is compressed at the middle, with very deep terminal articular concavities, strongly marked by concentric lines: the sides are deeply excavated near the neural and hæmal arches, which are long and narrow.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

714. A vertebral centrum of the same species of Xiphioid fish.

It is long in proportion to its breadth, is contracted at the middle and expanded at the hollow articular ends, like an hour-glass: the parapophysis, which projected from a longitudinal ridge at the side of the centrum, is broken; and the neurapophyses, which arise as thin plates from the whole extent of the upper surface of the centrum, have been broken off, showing the very narrow neural canal.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

715. The centrum of a vertebra of a large Scomberoid fish, allied to the *Xiphias.*

It is long in proportion to its breadth, and is deeper than it is broad, the periphery of the terminal articular cavities describing an ellipse. The middle of the side of the centrum is raised as an obtuse ridge between the compressed parts near the bases of the neural and hæmal arches. The neurapophyses are long, thin, vertical, and consequently parallel, laminæ at their confluent basal part, which alone is here preserved. The diverging laminæ below appear to be parapophyses.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

716. Three vertebræ from the anterior part of the trunk, cemented together by London clay, of a large osseous fish, probably *Brychætus Mülleri.*

The centrum is short in proportion to its breadth and depth; its fore-surface is impressed by longitudinal pits and grooves of varying breadth and depth, the largest being nearest the neural arch. This arch has coalesced with the centrum: a strong angular zygapophysis is sent forwards from the fore-part of the base of each neurapophysis, the exterior surface of which is also impressed with irregular pits: the terminal concave articular surfaces are marked by strong concentric lines.

The neural spine, which is connate, has been broken off.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

717. A trunk-vertebra, with several dermo-neural spines of a dorsal fin and fragments of other bones and scales, cemented together by London clay, of a fish, probably *Brychætus Mülleri.*

The centrum is short in proportion to its breadth, with the margin of its articular concavity truncate and the concavity shallow, and strongly marked by concentric lines. The sides of the centrum and the outer side of the neural arch are reticulated by the irregular depressions in the osseous substance: the neural arch is confluent with the centrum.

From the eocene formations of the Isle of Sheppey, Kent. *Hunterian.*

718. Portions of ribs, interneural spines and other bones of apparently the same species of fossil fish, cemented together by London clay.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

719. Two caudal vertebræ of a large and probably Scomberoid fish. They show the characters of the truncation or oblique flattening of the border of the terminal articular concavities, and the irregularity of the free surface of the centrum, as in the preceding examples. The neural and hæmal arches are very sloping and overlap each other, and are broad and flattened as in the Scomberoid Tunny.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

720. The bodies of four caudal vertebræ of a fish, of apparently the Halecoid family. The breadth is more than twice the length: the free surface, where not abraded, is smooth and even. The coalesced bases of the neurapophyses and parapophyses are not co-extensive with the neural and hæmal canals, and they seem to have been directly perforated by the nerves.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

721. The body of a vertebra of a fish; it is remarkable for its shortness and its subtriangular form, with the angles rounded off.

The external non-articular surface is almost flat and entire.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

722. A portion of petrified clay, in which are imbedded the bodies of four caudal vertebræ of a fish, of the Salmonoid or Halecoid family. The breadth of the centrum is almost double the length; the anchylosed bases of the neurapophyses and parapophyses are not co-extensive with the neural and hæmal grooves; the sides of the centrum are smooth and polished where the surface has not been abraded: the concentric striæ of the articular cones are strongly marked.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

723. The bodies with the coalesced bases of the neurapophyses and parapophyses of four of the caudal vertebræ, cemented together by London clay, of a fish.

The centrum is deeper than it is broad, and is almost twice as broad as it is long; the sides are impressed with fine longitudinal grooves; the border of the articular cavities is tumid, or rounded and smooth: the outer surface of both neur- and par-apophyses is coarsely reticulated, with the chief ridges longitudinal.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

724. The bodies and coalesced neurapophyses and parapophyses of five of the posterior abdominal vertebræ, cemented together by London clay, of a fish.

The border of the articular concavity is tumid, and the sides of the body concave and finely striated lengthwise; the neur- and par-apophyses are co-extensive with the centrum; the former processes send forwards large obtuse zygapophyses.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

725. Three trunk-vertebræ, with some interneural spines and other dermal bones cemented together by London clay, of a fish.

The centrum is nearly as long as it is broad, slightly excavated below, and more deeply on each side; the neurapophyses are confluent with their centrum and unite to form a long spine; on one side are two dermal bones, unequally four-sided, with fine longitudinal striæ on the outer surface, and a bony peduncle continued from one angle.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

726. A group of eight centrums of trunk-vertebræ, with portions of the neurapophyses, cemented together by London clay, of a fish.

The centrums are short in proportion to their depth, with the terminal articular concavities not very deep, marked with fine concentric lines; the free surface is longitudinally grooved, with short parapophyses from near the lower part of the side. The neurapophyses are slender, seem not to have become anchylosed to the centrum, and send off both anterior and posterior zygapophyses, the latter inclining outwards.

In some characters they resemble the vertebræ of the Plagiostomous fishes; but the neurapophyses are completely ossified.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

727. A nodule of petrified eocene clay, containing some vertebræ and fragments of bone of a small fossil fish.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

728. A portion of eocene clay, cementing together two vertebræ, some fragments of bones, and part of a 'soft' ray of the fin of a fish.

The centrum is much shorter than it is broad; its free surface is longitudinally rugous, and the same character marks the outer surface of the neur- and par-apophyses. The ray is compressed; its divisions are numerous and very short; they are twice bent upon themselves, with the middle oblique part narrower than the transversely disposed ends of the segments.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

729. A small portion of a 'soft' ray, apparently near its bifurcation, of a fish. It

is compressed, and the divisions present a similar character to that in the portion of ray preserved in No. 728; but they repeat the double bend twice, and a longitudinal impression along the middle of each side indicates the beginning of the fission of the ray.

A similar form and disposition of the segments may be observed in the soft rays of the Lepidosteus and Salmon, and in those of the ventral fins of the Tunny.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

730. The terminal coalesced vertebræ, with the fin-rays more or less mutilated, of a Scomberoid fish, probably *Tetrapterus priscus*.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

731. The opposite conical articular ends of the bodies of two contiguous vertebræ, cemented together by petrified clay, of a fish.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

732. A tray of seven specimens of the terminal coalesced caudal vertebræ, fossilized and more or less mutilated, most of them apparently of the same species of fish.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

733. The scaled integument of the right side of the trunk, with some of the rays of the pectoral fin, cemented to a mass of eocene clay, of a fish, probably allied to the *Pygacanthus*, No. 688.

From the eocene tertiary formations of the Isle of Sheppey, Kent.

Hunterian.

734. This specimen is placed in the Hunterian MS. Catalogue in Section O, amongst the remains of Birds, with the following description:—"A piece of Stonesfield stone with a thin black bone upon it." It bears the closest resemblance to a dorsal spine of a cartilaginous fish allied to the Dog-fish.

From the oolitic formations of Stonesfield, Oxfordshire. *Hunterian.*

735. A slab of lithographic slate, with the impressions of a variously contorted tube, supposed to be the intestinal canal of a fossil fish, and thence called 'Cololite.'

From the oolitic formations of Solenhofen. *Hunterian.*

736. "Half of a copper slate ball, with an impression of blende or lead, small and conic, and like an ear of corn; the Germ. Cat. calls it an '*Ichthyolithus.*'"—Hunterian MS. Catalogue.

From Ilmenauer, in Franconia.

It is from the Zechstein formation: the impression shows no determinate characters of the structure of a fish. *Hunterian.*

THE END.

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